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# MENTAL ARITHMETIC

WILLIAM RAPER

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# MENTAL ARITHMETIC

BY

EDWARD WEIDENHAMER, PH. B.

HARRISBURG, PA.:
R. L. MYERS & CO.
1899

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# PREFACE

Mental Arithmetic is a valuable study. Properly taught, it leads the pupil to concentrate his mind and to do rapid, logical and intelligent reasoning. It gives him mental power that cannot be derived from any other branch in a common school curriculum.

A logical sequence exists between the problems of this book. It begins with very simple problems, and advances by easy, graded steps to problems more complex and difficult. It presents but one difficulty at a time, and gives a clear, concise solution where it is necessary to explain the new principle.

A great many concrete problems are used in the introduction of every subject, while very few abstract problems are found in the book. After a careful treatment of every principle in each section, the section closes with a large number of review problems.

It will be seen at once that this Mental Arithmetic contains all the essentials; that it omits all puzzles and obsolete problems; and that the pupil who masters it must have a thorough knowledge of what is practical in arithmetic.

The author desires to express his obligations to many prominent principals and superintendents who have read the manuscript of this book and given him valuable assistance.

EDWARD WEIDENHAMER.

MILTON, PA.

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# MENTAL ARITHMETIC

## WHOLE NUMBERS

### ADDITION

1. John has 2 apples, and Mary gives him 1 more. How many apples has John then?

SOLUTION.—If John has 2 apples, and Mary gives him 1 more, John then has 2 apples and 1 apple, which are 3 apples.

2. Fred has 1 thumb on his right hand and 1 on his left hand. How many thumbs has he on both hands?

3. A boy had 1 cent, and received 2 more. How many cents had he then?

4. Frank had 2 marbles in one pocket and 2 in another. How many marbles had he in both pockets?

5. Jennie picked 3 white roses and 2 red ones. How many roses did she pick?

6. Heber solved 4 problems, and Ruth solved 3. How many problems did both solve?

7. May gave 3 cents to her sister and 3 cents to a beggar. How many cents did she give to both?

8. Mr. Smith has 3 white horses, 3 black horses, and 2 bay horses. How many horses has he?

9. Ralph gave me 5 apples, and Edward gave me 4. How many apples did both give me?

10. Harry has 4 books, and his brother has 4. How many books have they together?

11. Charles earned 4 cents on Monday and 5 cents on Tuesday. How many cents did he earn on both days?

12. A pupil answered 6 questions right and 2 wrong. How many questions did he try to answer?

13. There are 5 apples on one limb and 5 apples on another. How many apples are there on both limbs?

14. A slate cost 8 cents and a pencil 1 cent. How many cents did both cost?

15. There are 6 boys in one class and 4 in another. How many boys are there in both classes?

16. Florence had 6 roses, and gathered 5 more. How many roses did she then have?

17. Willie earned 2 dollars, and his father earned 8 dollars. How many dollars did they together earn?

18. James rode 6 miles and walked 6 miles. How many miles did he travel?

19. Alice saw 7 birds sitting on a fence and 6 on the ground. How many birds did she see?

20. Grant caught 7 rats with one trap and 5 with another. How many rats did he catch with both traps?

21. A teacher gave for a lesson on Monday 4 problems, on Tuesday 4, and on Wednesday 5. How many problems did the teacher give in the three days?

22. Lewis is 6 years old, and his sister is 3 years older. How old is his sister?

23. In a school one class has 9 boys, and another has 6 boys. How many boys have the two classes?

24. Seven boys are playing, and 4 boys are looking on. How many boys are there in all?

25. I gave 4 cents to 1 boy, 5 to another, and 5 to another. How many cents did I give to all?

26. If I have 8 cents in one hand and 8 cents in the other, how many cents have I in both hands?

27. A pig cost 10 dollars, and a sheep cost 7 dollars. What did they both cost?

28. Find the cost of a coat, if the cloth cost 12 dollars and the making 6 dollars.

29. Peter had 7 cents, and found 9 cents. How many cents had he then?

30. After paying 5 cents for a top, Abram has 10 cents left. How many cents had he at first?

31. A lady bought a dress for 12 dollars, a hat for 5 dollars, and a parasol for 3 dollars. How many dollars did she pay for all?

32. One piece of cloth contains 12 yards, and another contains 5 yards. How many yards are there in both pieces?

33. There are 7 days in one week, and 14 days in two weeks. How many days are there in three weeks?

34. Howard walked 15 miles in the forenoon, and 10 miles in the afternoon. How far did he walk during the day?

35. A farmer sold 8 bushels of potatoes to one man, 7 to another, and 7 to another. How many bushels did he sell?

36. Two birds fly in opposite directions; one flies 12 miles, and the other 7 miles. How far apart are they?

37. I gave 9 apples to my sister, 8 to my brother, and then had 7 for myself. How many apples had I at first?

38. Jane put 7 cents into her bank at one time, at another time 9 cents, and at another time 11 cents. How many cents in all did she put into her bank?

39. A man sold 9 tons of coal one day, 8 tons the next day, and 6 tons on the day following. How many tons did he sell in the three days?

**40.** Twelve pigeons are sitting on one limb of a tree, and 16 on another. How many pigeons are there on both limbs?

**41.** Arthur found 9 peaches under one tree, 11 under another, and 10 under another. How many peaches did he find?

**42.** Lucy spent 15 cents for a comb, and 11 cents for some ribbon. How much money did she spend for both?

**43.** There are 12 weeks in the winter term, and 14 weeks in the spring term. How many weeks are there in both terms?

**44.** Roy had 8 marbles, and Linn had 6 more than Roy. How many marbles had they together?

**45.** Ethel bought a box of paper for 25 cents, some pens for 5 cents, and a pencil for 2 cents. How much did she pay for all?

**46.** If there are 12 buttons on one card and 16 buttons on another, how many buttons are there on both cards?

**47.** A lawyer collected 12 dollars from one man, 11 dollars from another, and 10 dollars from another. How many dollars did he collect from the three men?

**48.** Alice earned 17 dollars, and Theodore earned 5 dollars more than Alice. How many dollars did both earn?

**49.** How many are 6 and 7?

SOLUTION.—6 and 7 are 13.

**50.** How many are 8 and 2? 9 and 2? 9 and 4? 9 and 5? 8 and 4? 8 and 7? 20 and 7? 25 and 4?

**51.** How many are 6 and 6? 4 and 6? 8 and 6? 8 and 5? 9 and 3? 7 and 2? 13 and 3? 21 and 7?

**52.** How many are 3 and 8? 5 and 8? 7 and 7? 9 and 9? 8 and 8? 10 and 10? 6 and 9? 26 and 5?

53. How many are 5 and 5? 4 and 8? 3 and 10? 5 and 12? 10 and 9? 3 and 12? 4 and 13? 6 and 7?

54. How many are 10 and 7? 12 and 2? 7 and 5? 11 and 8? 3 and 15? 13 and 4? 5 and 16? 18 and 5?

55. How many are 14 and 4? 15 and 7? 6 and 11? 9 and 6? 2 and 19? 3 and 16? 11 and 5? 18 and 9?

56. How many are 11 and 2? 12 and 5? 15 and 5? 19 and 4? 17 and 10? 4 and 23? 19 and 9? 16 and 10?

57. How many are 19 and 5? 23 and 3? 14 and 4? 24 and 4? 2 and 17? 24 and 7? 26 and 7? 25 and 9?

58. How many are 21 and 3? 12 and 4? 8 and 10? 5 and 14? 11 and 13? 15 and 10? 28 and 9? 21 and 8?

59. How many are 12 and 9? 11 and 15? 6 and 17? 7 and 19? 22 and 5? 9 and 15? 4 and 21? 5 and 9?

60. How many are 24 and 8? 26 and 9? 31 and 6? 34 and 7? 43 and 8? 17 and 9? 36 and 6? 38 and 8?

61. How many are 40 and 8? 42 and 10? 41 and 6? 15 and 15? 25 and 10? 35 and 10? 45 and 9? 48 and 9?

62. How many are 9 and 7 and 8? 4 and 8 and 11? 6 and 9 and 7? 5 and 7 and 7? 18 and 3 and 7?

63. How many are 24 and 6 and 8? 18 and 7 and 6? 28 and 9 and 8? 34 and 6 and 7? 42 and 8 and 9?

64. How many are 18 and 10? 14 and 20? 25 and 30? 15 and 60? 32 and 40? 34 and 60? 12 and 70? 48 and 50?

65. How many are 31 and 20 and 5? 22 and 30 and 9? 43 and 40 and 8? 64 and 10 and 9?

66. How many are 24 and 23?

SOLUTION.—24 and 23 are equal to 24 and 20 and 3. 24 and 20 are 44, and 3 are 47. Therefore 24 and 23 are 47.

67. How many are 47 and 33? 54 and 22? 24 and 67? 54 and 42? 33 and 35? 26 and 52?

68. How many are 88 and 22? 69 and 23? 69 and 64? 58 and 34? 28 and 22? 85 and 54?

69. How many are 24 and 23 and 10? 25 and 34 and 20? 64 and 18 and 30? 32 and 44 and 40?

70. How many are 22 and 18 and 15? 25 and 34 and 18? 61 and 24 and 12? 66 and 54 and 28?

71. Count by 2's from 2 to 100. Thus: 2, 4, 6, 8, 10, 12, etc.

72. Count by 2's from 1 to 99.

73. Count by 3's from 3 to 96.

74. Count by 5's from 5 to 100.

75. Count by 4's from 4 to 100; from 1 to 101; from 2 to 102; from 3 to 103.

76. Count by 6's from 6 to 102; from 1 to 97; from 2 to 104; from 3 to 99; from 4 to 100; from 5 to 101.

77. Count by 7's from 7 to 105; from 1 to 99; from 2 to 100; from 3 to 108; from 4 to 102; from 5 to 103; from 6 to 104.

78. Count by 8's from 8 to 96; from 1 to 97; from 2 to 98; from 3 to 99; from 4 to 100; from 5 to 101; from 6 to 102; from 7 to 103.

79. Count by 9's from 9 to 108; from 1 to 100; from 2 to 101; from 3 to 102; from 4 to 103; from 5 to 104; from 6 to 105: from 7 to 106; from 8 to 107.

80. Count by 10's from 3 to 103.

81. Count by 11's from 4 to 114.

82. Count by 12's from 12 to 144.

83. A woman sold 35 pounds of butter at one time, 38 pounds at another time, and 40 pounds at another time. How many pounds did she sell in all?

84. Mr. Jones bought a horse for 50 dollars, a wagon

for 42 dollars, and a set of harness for 15 dollars. What did all cost?

85. Eva paid 60 cents for a geography, 35 cents for an arithmetic, and 24 cents for a speller. How many cents did she pay for all?

86. Albert rode his bicycle 52 miles on Monday, 58 miles on Tuesday, and 60 miles on Wednesday. How many miles did he ride in the three days?

87. Mr. Black sold 34 turkeys, the foxes carried off 17, and he had 23 left. How many turkeys had he at first?

88. A saddle cost 26 dollars, a bridle 8 dollars, and a pony as much as the saddle and bridle together. How much did the pony cost? How much did all cost?

89. The distance from Harrisburg to Sunbury is 54 miles, and from Sunbury to Williamsport is 41 miles. How far is it from Harrisburg to Williamsport?

90. A buggy cost 75 dollars, and a horse cost 15 dollars more than the buggy. What did both cost?

91. Mr. Way cast his first vote when he was 21 years old. That was 26 years ago. How old is he now?

92. March has 31 days, April has 30 days, and May has 31 days. How many days are there in these three months?

93. If I pay 16 dollars a month for boarding, 3 dollars for washing, 4 dollars for clothing, and have 37 dollars of my month's wages left, how much did I earn?

94. Guy is 14 years old, Walter is 26 years old, and their father is 54 years old. What is the sum of their ages?

95. How many cows are there in three fields, if there are 25 in the first field, 27 in the second, and 40 in the third?

**96.** In one car there were 64 people, and in another car 39. How many people were there in both cars?

**97.** If a man is 50 years old now, how old will he be 33 years later?

**98.** I paid 100 dollars for a horse, and then sold him so as to gain 25 dollars. For how much did I sell him?

**99.** A butcher bought two calves; one weighed 68 pounds, and the other 9 pounds more. How much did they together weigh?

**100.** If 23 years ago Mrs. White was 18 years old, and Mr. White is 6 years older than Mrs. White, what is the sum of their ages at present?

**101.** One boy caught 38 fish, another 33, and a third 24. How many fish did the three boys together catch?

**102.** Harvey picked 32 quarts of cherries, Morgan picked 16 quarts more than Harvey, and their father picked 20 quarts more than both boys. How many quarts of cherries did the three pick?

**103.** The distance from Boston to New York is 208 miles, and from New York to Washington it is 142 miles. How far is it from Boston to Washington?

**104.** How many strokes does the hammer of a clock strike during a period of 12 hours?

## SUBTRACTION

**1.** Harry had 4 cents, and lost 1 of them. How many cents had he left?

SOLUTION.—Since Harry had 4 cents, and lost 1 of them, he had left the difference between 4 cents and 1 cent, which is 3 cents.

**2.** William had 3 apples, and ate 1 of them. How many apples had he left?

3. Frank had 6 marbles, and lost 2 of them. How many marbles had he then?

4. John had 8 chestnuts, and gave his sister 2 of them. How many chestnuts did he keep?

5. If there were 7 birds on the fence and 2 of them flew away, how many birds remained?

6. Kate had 11 eggs, but 4 of them were bad. How many eggs were good?

7. A boy had 12 chickens; 3 were black and the rest were white. How many chickens were white?

8. Fred planted 14 trees, and 6 of them died. How many lived?

9. I sold some wheat for 16 dollars, which cost me 6 dollars. What was my gain?

10. Mary is 15 years old. How old was she 6 years ago?

11. In a class of 17 pupils 6 are boys and the rest are girls. How many girls are there?

12. From a string 18 feet long a piece 9 feet long was cut. How many feet long was the other piece?

13. Eleven roses are how many more than 7 roses?

14. A wagon was bought for 9 dollars and sold for 20 dollars. What was the gain?

15. I paid 18 cents for a pound of coffee and 6 cents for a pound of sugar. How much more did I pay for the coffee than for the sugar?

16. Jennie has 8 cents, and Bruce has 21. How many cents has Bruce more than Jennie?

17. Howard is 24 years old, and his sister is 9 years younger. How old is his sister?

18. If Charles earns 21 dollars a week, and pays 7 dollars for boarding and other expenses, how much can he save?

**19.** Grant is 7 years old. How long will it be till he is 25 years old?

**20.** Heber solved 19 problems, and Ralph solved 7. How many more problems did Heber solve than Ralph?

**21.** A man bought 35 horses, and sold 9 of them. How many horses had he left?

**22.** Alice has 22 cents, and Linn has 9 cents less than Alice. How many cents has Linn?

**23.** A can filled with lard weighs 23 pounds, and the can alone weighs 6 pounds. What is the weight of the lard?

**24.** A merchant bought some goods for 10 dollars, and sold them for 17 dollars. How many dollars did he gain?

**25.** The fifth boy in the class stays at home on account of sickness, and goes down to number 13. How many places does he lose?

**26.** The sum of two numbers is 23, and one of the numbers is 8. What is the other number?

**27.** If I had 8 marbles more I would have 15 marbles. How many marbles have I?

**28.** What number of dollars must be added to 10 dollars to make 18 dollars?

**29.** What number must be taken from 19 to leave 5?

**30.** A farmer had 25 sheep, and lost 11 of them. How many sheep had he then?

**31.** How many are 8 less 2?

SOLUTION.—8 less 2 are 6.

**32.** How many are 6 less 4? 8 less 3? 13 less 7? 20 less 7? 15 less 6? 15 less 8? 20 less 5? 18 less 4?

**33.** How many are 12 less 7? 8 less 4? 18 less 5? 11 less 8? 20 less 6? 10 less 3? 18 less 7? 8 less 6?

**34.** How many are 13 less 9? 17 less 6? 13 less 8? 19 less 8? 11 less 5? 13 less 4? 9 less 7? 8 less 5?

**35.** How many are 19 less 7? 12 less 9? 13 less 6? 19 less 8? 11 less 5? 13 less 4? 13 less 3? 10 less 6?

**36.** How many are 15 less 3? 14 less 7? 18 less 9? 12 less 6? 12 less 8? 17 less 4? 19 less 5? 17 less 7?

**37.** How many are 6 less 3? 20 less 7? 19 less 9? 14 less 6? 14 less 8? 16 less 5? 20 less 4? 9 less 4?

**38.** How many are 8 less 3? 15 less 7? 21 less 9? 19 less 6? 18 less 8? 16 less 5? 18 less 4? 11 less 4?

**39.** How many are 9 less 3? 14 less 9? 9 less 6? 17 less 8? 12 less 5? 15 less 4? 7 less 5? 10 less 7?

**40.** How many are 7 less 3? 16 less 7? 15 less 9? 16 less 8? 16 less 6? 20 less 8? 14 less 5? 12 less 4?

**41.** How many are 14 less 3? 11 less 6? 16 less 9? 11 less 7? 16 less 8? 10 less 4? 17 less 5? 11 less 9?

**42.** What is the difference between 17 and 9? 15 and 6? 11 and 8? 11 and 5? 19 and 4? 12 and 5? 17 and 3? 20 and 3?

**43.** How many are 16 less 3? 14 less 4? 10 less 8? 7 less 4? 13 less 5? 9 less 4? 17 less 10? 24 less 10?

**44.** How many are 25 less 20? 32 less 20? 45 less 30? 54 less 40? 18 less 10? 65 less 40? 85 less 50? 90 less 70?

**45.** How many are 44 less 26?

SOLUTION.—26 are equal to 20 and 6. 44 less 20 are 24, and 24 less 6 are 18. Therefore 44 less 26 are 18.

**46.** How many are 23 less 18? 25 less 17? 24 less 15? 20 less 16? 22 less 16? 28 less 16? 32 less 21?

**47.** How many are 34 less 18? 44 less 37? 43 less 18? 36 less 17? 33 less 14? 44 less 15? 50 less 25? 46 less 28?

**48.** How many are 39 less 27? 42 less 25? 60 less 38? 75 less 44? 68 less 39? 72 less 44? 68 less 54? 82 less 56?

**49.** Take 46 from 80; 42 from 71; 28 from 64; 57 from 85; 64 from 90; 36 from 100; 58 from 94; 66 from 95.

**50.** Take 56 from 83; 48 from 72; 28 from 90; 32 from 80; 41 from 75; 36 from 75; 32 from 54; 53 from 98.

**51.** Subtract 48 from 86; 67 from 100; 32 from 100; 58 from 100; 85 from 100; 43 from 86; 49 from 80; 78 from 130.

**52.** Subtract 17 from 34; 64 from 86; 88 from 95; 28 from 65; 55 from 97; 26 from 99; 24 from 96; 39 from 51.

**53.** Take 37 from 93; 18 from 79; 40 from 62; 29 from 92; 33 from 101; 52 from 198; 45 from 180; 35 from 139.

**54.** How many are 131 less 83? 126 less 87? 193 less 77? 199 less 132? 125 less 89? 173 less 74? 182 less 119? 200 less 47?

**55.** Take 22 from 196; 128 from 144; 118 from 194; 139 from 192; 117 from 119; 51 from 197; 130 from 200; 125 from 300.

**56.** Take 75 from 200; 225 from 500; 160 from 480; 136 from 436; 230 from 347; 220 from 496; 540 from 562; 145 from 455.

**57.** Subtract 344 from 574; 280 from 500; 132 from 196; 55 from 123; 305 from 525; 58 from 134; 470 from 600; 327 from 597.

**58.** Subtract by 3's from 99 to 0. Thus: 99, 96, 93, 90, etc.

**59.** Subtract by 4's from 100 to 4; from 99 to 3; from 98 to 2; from 97 to 1.

**60.** Subtract by 5's from 100 to 0; from 99 to 4; from 98 to 3; from 97 to 2; from 96 to 1.

61. Subtract by 6's from 96 to 0; from 97 to 1; from 98 to 2; from 99 to 3; from 100 to 4; from 101 to 5.

62. Subtract by 7's from 105 to 0; from 104 to 6; from 103 to 5; from 102 to 4; from 101 to 3; from 100 to 2; from 99 to 1.

63. Subtract by 8's from 96 to 0; from 97 to 1; from 98 to 2; from 99 to 3; from 100 to 4; from 101 to 5; from 102 to 6; from 103 to 7.

64. Subtract by 9's from 108 to 0; from 107 to 8; from 106 to 7; from 105 to 6; from 104 to 5; from 103 to 4; from 102 to 3; from 101 to 2; from 100 to 1.

65. Subtract by 10's from 98 to 8.

66. Subtract by 11's from 99 to 0.

67. Subtract by 12's from 100 to 4.

68. If I have 18 cents, how many more cents do I need to have 25 cents?

69. A cow that cost 20 dollars was sold for 45 dollars. What was the gain?

70. Edward spent 16 days at Cape May, 9 days at Washington, and the rest of his vacation at home. How many days was he at home if his vacation lasted 50 days?

71. In an orchard of 54 trees 16 were blown down. How many trees were then standing?

72. I gave the clerk 50 dollars, and he gave me back 26 dollars change. How much was my bill?

73. A bushel of wheat cost 96 cents, and a bushel of oats cost 38 cents. How much more did the wheat cost than the oats?

74. In a school there were 52 pupils. If 26 were promoted, how many pupils remained?

75. If a father is 62 years old, and his son is 29 years old, what is the difference in their ages?

76. Ulysses S. Grant lived 63 years, and Abraham Lincoln lived 56 years. How many years more did Grant live than Lincoln?

77. The Washington monument is 555 feet high, and the Statue of Liberty is 305 feet high. How much higher is the one than the other?

78. A boy bought a bicycle for 55 dollars. How much did he owe after paying 29 dollars?

79. A man who died at the age of 72 years had been married 38 years. What was his age when he married?

80. How many must be added to 39 to make 73?

81. The sum of two numbers is 84, and one of them is 56. What is the other number?

82. The difference between two numbers is 27, and the greater is 66. What is the less number?

83. A bought a horse for 228 dollars, and sold him at a loss of 35 dollars. At what price did he sell the horse?

84. There are 52 weeks in a year. If 43 weeks have expired, how many weeks remain?

85. There are 39 books in the Old Testament, and 27 books in the New. How many more books are there in the one than in the other? How many books are there in the Bible?

86. Peter and James started from the same place, and traveled in the same direction. Peter walked 26 miles in a day. James walked 41 miles in a day. How many miles apart were they? How many miles apart would they have been if they had traveled in opposite directions?

87. What number is as much greater than 60 as 29 is less than 43?

88. Roy walked 43 miles one day, 35 miles the next,

and on the third day returned 32 miles. How far was he then from the starting point?

89. Linn bought a horse for 80 dollars, a set of harness for 25 dollars, and a buggy for 75 dollars. He sold the outfit for 200 dollars. How much did he gain?

90. Arthur, having 75 cents, spends 18 cents, and then earns 32 cents. How much has he then?

91. From 96 take the sum of 44 and 33.

92. In one flock there are 53 turkeys, in a second flock there are 39 turkeys, and in a third flock there are enough to make the entire number of turkeys in the three flocks 140. How many turkeys are there in the third flock?

93. Ethel made 140 bouquets. She sold 38 of them on the first evening, and on the second evening 26 more than on the first. How many bouquets did she fail to sell?

94. Ralph saved 98 cents, and his mother gave him 74 cents. He then bought a sled for 85 cents, and a pair of skates for 66 cents. How much money had he then?

95. The difference between two numbers is 37, and the less is 44. What is the greater number? What is the sum of the numbers?

96. Albert, having a number of marbles, bought 18 and sold 32, and then had 8 left. How many marbles had he at first?

97. A man's wages were 100 dollars a month. He spent 32 dollars for his family and 16 dollars for rent. How much money could he save?

98. How many are 43 and 18, less 17?

99. How many are 54 less 26 and 19?

100. By selling a horse for 125 dollars, a man would

gain 49 dollars. How much should he receive for the horse to gain 33 dollars?

101. Abram is 37 years of age, which is 9 years more than Eva's age, and 12 years less than Jane's age. What is the age of each?

102. One number exceeds 164 by 49, and another number falls short of 142 by 48. Find the difference between these numbers?

103. Harry had 88 cents and Frank had 45 cents. Frank gave Harry 29 cents. How much more did the one then have than the other?

104. How many are 11 plus 7, minus 8, plus 9, minus 6, plus 10, minus 14, plus 18, minus 16, plus 37?

## MULTIPLICATION

1. What will 3 pears cost at 2 cents each?

SOLUTION.—Since 1 pear costs 2 cents, 3 pears will cost 3 times 2 cents, which are 6 cents.

2. At 3 cents apiece, how much will 3 oranges cost?

3. One buggy has 4 wheels. How many wheels have 2 buggies?

4. If a man walks 4 miles in 1 hour, how far will he walk in 3 hours?

5. There are 7 days in 1 week. How many days are there in 2 weeks?

6. If a family uses 5 pounds of sugar in a week, how many pounds will it use in 2 weeks?

7. At 4 dollars a barrel, what will 4 barrels of apples cost?

8. If a cow gives 5 quarts of milk in one day, how many quarts will she give in 3 days?

9. A horse travels 6 miles in 1 hour. How far will he travel in 3 hours?

10. In 1 pint there are 4 gills. How many gills are there in 5 pints?

11. Ruth is 6 years old, and her father is 4 times as old. How old is the father?

12. Five boys can do a piece of work in 5 days. How many days will it take 1 boy to do the same work?

13. Harry recites 7 lessons in 1 day. How many lessons will he recite in 3 days?

14. If each one of 6 hens weighs 6 pounds, how many pounds will they together weigh?

15. A spider has 8 legs. How many legs have 4 spiders?

16. How many acres are there in 4 fields of 7 acres each?

17. There are 3 feet in 1 yard. How many feet are there in 9 yards?

18. Twelve months make 1 year. How many months are there in 3 years?

19. John is 11 years old, and his father is 3 times as old. How old is his father?

20. Since 10 cents make a dime, how many cents are there in 4 dimes?

21. How many trees are there in 7 rows of 5 trees each?

22. If 1 horse eats 9 quarts of oats in a day, how many quarts will 5 horses eat?

23. There are 11 books on each shelf of a book case. How many books are on 4 shelves?

24. How many hills of beans are there in 6 rows of 7 hills each?

25. What is the distance around a 4-sided field, if each side is 12 rods long?

**26.** How many dollars are there in 10 5-dollar bills?

**27.** If Jennie went to school every school day for a term of 12 weeks, how many days did she attend?

**28.** At 7 cents a pound, what is the cost of 7 pounds of rice?

**29.** What will 7 quarts of chestnuts cost at 8 cents a quart?

**30.** How many working days are there in 9 weeks?

**31.** How much can a boy earn in 9 hours, if he earns 7 cents in 1 hour?

**32.** How many are 2 times 11?

SOLUTION.—Two times 11 are 22.

**33.** How many are 2 times 5? 3 times 4? 4 times 4? 3 times 5? 6 times 4? 7 times 6? 4 times 7? 3 times 9?

**34.** How many are 2 times 6? 3 times 5? 4 times 6? 5 times 6? 6 times 7? 2 times 9? 3 times 7? 5 times 10?

**35.** How many are 2 times 7? 3 times 10? 3 times 8? 4 times 8? 5 times 7? 6 times 8? 4 times 10? 3 times 11?

**36.** How many are 2 times 8? 4 times 9? 5 times 11? 4 times 5? 8 times 7? 9 times 9? 12 times 10? 9 times 8?

**37.** How many are 7 times 8? 8 times 8? 3 times 12? 5 times 12? 6 times 11? 12 times 7? 12 times 4? 6 times 9?

**38.** How many are 3 times 6? 5 times 8? 6 times 10? 9 times 7? 8 times 10? 7 times 7? 6 times 6?

**39.** How many are 7 times 12? 8 times 12? 9 times 8? 5 times 9? 12 times 8? 9 times 10? 9 times 6? 12 times 5?

**40.** How many are 7 times 9? 7 times 11? 12 times 6? 12 times 9? 8 times 6? 4 times 11? 6 times 6? 8 times 11?

**41.** How many are 8 times 9? 9 times 12? 12 times 12? 12 times 11? 7 times 10? 6 times 12? 12 times 3? 10 times 10?

**42.** How much will 4 cows cost at 42 dollars each?

**43.** A train runs 35 miles an hour. How far will it run in 5 hours?

**44.** Mr. James has 16 bags of clover-seed, each containing 2 bushels. How much is it worth at 4 dollars a bushel?

**45.** What will 6 horses cost at 130 dollars each?

**46.** There are 60 seconds in one minute. How many seconds are there in 7 minutes?

**47.** If it takes 8 nails to fasten 1 horseshoe, how many nails will it take to shoe 2 horses?

**48.** On a table there are 8 plates, and each plate contains 18 plums. How many plums are on all the plates?

**49.** If 1 acre produces 45 bushels of corn, how many bushels will 9 acres produce?

**50.** Since 12 inches make 1 foot, how many inches are there in 30 feet?

**51.** There are 63 gallons in 1 hogshead. How many gallons are there in 12 hogsheads?

**52.** There are 60 minutes in 1 hour. How many minutes are there in 9 hours?

**53.** In 1 day there are 24 hours. How many hours are there in 11 days?

**54.** How many pounds are there in 8 barrels of salt, each barrel containing 280 pounds?

**55.** A clock strikes 156 times in one day. How many times does it strike in 6 days?

56. There are 52 weeks in 1 year. How many weeks are there in 7 years?

57. If Frank earns 25 dollars per month, how much does he earn in a year?

58. Elmer saved 28 stamps, and Andrew saved 6 times as many. How many stamps did Andrew save?

59. How many are 6 times 52? 8 times 54? 7 times 45? 9 times 38?

60. How many are 4 times 6 times 9? 8 times 7 times 5? 4 times 6 times 5? 12 times 11 times 3?

61. How many are 9 times 8 times 5? 9 times 6 times 10? 8 times 9 times 11? 5 times 12 times 9?

62. How many are 7 times 8 times 20? 4 times 12 times 9? 20 times 4 times 8? 5 times 40 times 8?

63. A clerk receives 15 dollars a week, but spends 4 dollars for board, and 3 dollars for other expenses. How much does he save in 12 weeks?

64. How much will 75 yards of carpet cost at 60 cents a yard?

65. How much will 8 boxes of coffee, each containing 150 pounds, cost at 20 cents a pound?

66. There are 2 pints in a quart, and 4 quarts in a gallon. How many pints are there in 9 gallons?

67. What is the sum of 4 times 5 times 6 and 8 times 9?

68. What is the difference between 5 times 6 times 8 and 10 times 7 times 9?

69. Find the cost of 7 pounds of rice at 8 cents a pound, and 8 quarts of milk at 6 cents a quart?

70. A drover bought 8 hogs at 15 dollars each, and 12 sheep at 6 dollars each. How much would he gain if he sold them all for 225 dollars?

71. A teacher bought 8 tablets at 12 cents each, and 9 slates at 11 cents each. How much did the lot cost?

**72.** Mr. Smith sold 8 cows at 32 dollars each, and 5 horses at 105 dollars each. How much money did he receive for all?

**73.** Calvin earned 85 cents a day, and paid 40 cents a day for boarding. How much did he save in 5 days?

**74.** A farmer's wife gives a merchant 7 pounds of butter at 24 cents a pound, and receives 18 pounds of sugar at 8 cents a pound. How much is still due her?

**75.** What will a farm of 60 acres cost at 145 dollars an acre?

**76.** There are 365 days in 1 year. How many days are there in 2 years?

**77.** If a clerk earns 500 dollars a year, and his expenses are 275 dollars a year, how much can he save in 4 years?

**78.** How many times 12 are 8 times 12, and 6 times 12?

**79.** A dealer buys eggs at 15 cents a dozen, and sells them at 21 cents a dozen. How much does he gain on 9 dozen?

**80.** George rides 11 miles an hour on his bicycle. If he rides 8 hours on Monday, 9 hours on Tuesday, and 11 hours on Wednesday, how many miles does he ride?

**81.** Ralph and Watson start at the school-house and ride in opposite directions, at the rate of 12 miles and 9 miles an hour respectively. How far are they apart at the end of 8 hours?

**82.** I bought 8 yards of cloth at 18 cents a yard, and 12 yards of calico at 8 cents a yard. What was the amount of my bill?

**83.** There are 37 lines on a page. If there are 11 words in each line, how many words are there on the page?

84. Since there are 24 hours in a day, how many hours are there in 3 weeks?

85. In one box there are 64 apples, in another 38, and in a third there are 4 times as many apples as are in the other two boxes. How many apples are in the third box?

86. When beef is worth 8 cents a pound and pork 12 cents, how much more will 15 pounds of pork cost than 15 pounds of beef?

87. Two boys are 84 miles apart, and approach each other, one at the rate of 5 miles an hour, the other at 6 miles an hour. How far apart are they at the end of 6 hours?

88. At 56 cents each, how much will 4 ducks cost? 6 ducks? 8 ducks? 7 ducks? 9 ducks? 12 ducks?

89. Willie has 12 marbles. Frank has 4 times as many, less 26, and Albert has 3 times as many as Willie and Frank, less 16. How many marbles have the 3 boys together?

90. A worked for B 4 days at 65 cents a day. B sold A 18 pounds of lard, at 12 cents a pound. How much does B still owe A?

91. How many are 9 times 8, plus 11, minus 6?

92. How many are 5 times 24, minus 28, plus 46?

93. The milkman sells us 4 pints of milk daily. At 3 cents a pint, what will our milk bill be for the month of June?

94. A family uses 64 pounds of flour in 1 month. How many pounds does it use in 1 year?

95. The sum of two numbers is 27, and the greater number is 17. What is the product of the two numbers?

96. If the earth moves in its orbit 19 miles a second, how far does it move per minute?

**97.** Find the cost of the following articles: 10 pounds of sugar at 8 cents a pound, 8 pounds of tea at 60 cents a pound, and 6 pounds of coffee at 20 cents a pound.

**98.** If 1 quince is worth 6 plums, how many plums must be given for 24 quinces?

**99.** If I buy 12 tons of hay at 14 dollars a ton, and sell 8 tons at 16 dollars a ton, and the rest at 12 dollars a ton, how much do I make by the transaction?

**100.** Multiply 14 by 8, add 34, subtract 27, and name the result.

## DIVISION

1. How many oranges at 2 cents each can I buy for 6 cents?

SOLUTION.—Since 1 orange costs 2 cents, I can buy as many oranges for 6 cents as 2 are contained times in 6, which are 3.

2. At 3 cents each, how many pears can I buy for 12 cents?

3. If a boy walks 2 miles an hour, in how many hours will he walk 14 miles?

4. If 1 pencil costs 5 cents, how many pencils can be bought for 25 cents?

5. There are 4 quarts in 1 gallon. How many gallons are there in 24 quarts?

6. How many weeks are there in 56 days?

7. If Harry spends 5 cents a day, how many days will it take him to spend 50 cents?

8. In how many days will a man earn 72 dimes, if he earns 8 dimes a day?

9. John paid 63 cents for fish at 9 cents each. How many fish did he buy?

**10.** At 11 cents a pound, how many pounds of sugar can be bought for 66 cents?

**11.** How long will it take a man to earn 120 dollars, at 10 dollars a week?

**12.** How many yards of cloth, at 3 dollars a yard, can you buy for 45 dollars?

**13.** If 6 peaches cost 12 cents, how many cents does 1 peach cost?

SOLUTION (1).—If 6 peaches cost 12 cents, 1 peach costs as many cents as 6 are contained times in 12, which are 2.

SOLUTION (2).—If 6 peaches cost 12 cents, 1 peach costs one-sixth of 12 cents, or 2 cents.

**14.** If 5 boys earn 30 dollars, how many dollars does 1 boy earn?

**15.** How many men will do a piece of work in 5 days, if it requires 60 days for 1 man to do the same work?

**16.** If a family uses 32 pounds of butter in 4 weeks, how many pounds are used in 1 week?

**17.** If 12 pounds of sugar cost 132 cents, how many cents does 1 pound cost?

**18.** There are 144 problems on 12 pages. What is the average number on a page?

**19.** Divide 63 roses equally among 9 girls. How many does each receive?

**20.** If 9 hogs cost 81 dollars, what does 1 hog cost?

**21.** A train ran 120 miles in 4 hours. How many miles did it average per hour?

**22.** A earned 135 dollars in 9 weeks. What did he earn each week?

**23.** If 15 sheep are worth 90 dollars, what is 1 sheep worth?

**24.** If 10 dozen eggs cost 180 cents, what is the cost of 1 dozen?

**25.** When 8 cows cost 256 dollars, what does 1 cow cost?

**26.** If 12 acres of corn yield 360 bushels, how many bushels does 1 acre yield?

**27.** What is the cost of 1 ton of coal, if 5 tons cost 55 dollars?

**28.** When a dozen oranges are worth 60 cents, what is 1 orange worth?

**29.** How many times are 2 contained in 14?

SOLUTION.—Two are contained in 14, 7 times, since 7 times 2 are 14.

**30.** How many times are 3 contained in 15? In 18? In 21? In 27? In 24? In 30? In 36? In 39?

**31.** How many times are 5 contained in 25? In 35? In 40? In 55? In 60? In 70? In 45? In 65?

**32.** How many times are 4 contained in 24? In 36? In 40? In 64? In 72? In 84? In 96? In 100?

**33.** How many times are 6 contained in 36? In 48? In 60? In 66? In 78? In 96? In 90? In 72? In 54?

**34.** How many times are 8 contained in 40? In 48? In 72? In 88? In 80? In 96? In 104? In 64?

**35.** How many times are 7 contained in 42? In 56? In 63? In 84? In 98? In 77? In 49? In 70?

**36.** How many times are 9 contained in 54? In 90? In 108? In 99? In 81? In 135? In 180? In 63?

**37.** How many times are 12 contained in 48? In 144? In 120? In 132? In 180? In 240? In 108? In 336?

**38.** Twelve are how many times 6?

SOLUTION.—Twelve are 2 times 6, since 2 times 6 are 12.

**39.** Twenty-four are how many times 2? 3? 4? 6? 8?

**40.** Seventy-two are how many times 12? 9? 6? 24? 36?

**41.** How many times 2 are 12? 18? 20? 24? 36? 50? 60? 100?

42. In 120 there are how many 12's? 40's? 60's? 10's? 30's?

43. In 96 there are how many 6's? 3's? 8's? 4's? 2's?

44. In 17 there are how many 4's?

SOLUTION.—In 17 there are four 4's, and a remainder of 1.

45. In 19 there are how many 3's? 9's? 7's? 8's? 6's? 4's? 5's?

46. If 12 sheep cost 96 dollars, what do 8 sheep cost?

47. If 4 lemons are worth 60 peanuts, how many peanuts are 7 lemons worth?

48. If James works 8 hours per day, in how many days will he have worked 112 hours?

49. There are 352 quarts in 11 bushels. How many quarts are there in 5 bushels?

50. If 12 bicycles can be bought for 600 dollars, how many bicycles can be bought for 1,000 dollars?

51. If 8 coats are worth 56 dollars, what are 9 coats worth?

52. A steamship made 360 miles in 24 hours. How many miles did she average per hour?

53. There are 15,840 feet in 3 miles. How many feet are there in 1 mile?

54. How many times will a bicycle wheel, 12 feet in circumference, revolve in going a mile?

55. How many weeks are there in 840 hours?

56. A farmer sold 16 cows for 384 dollars. At what price per head did he sell them?

57. What is 1 of the 9 equal parts of 63?

58. What is 1 of the 8 equal parts of 576?

59. Frank had 100 cents. He bought 4 dozen pears, and had 4 cents left. What did he pay apiece for the pears?

**60.** When soap is worth 6 cents a cake, a girl gives 90 cents for 7 cakes of soap and 6 gallons of oil. How much does she pay a gallon for the oil?

**61.** How many pounds of butter, worth 25 cents a pound, must be given for 5 pounds of tea, worth 60 cents a pound?

**62.** How many pounds of sugar, worth 8 cents a pound, can I get for 7 dozen eggs, worth 16 cents a dozen?

**63.** I paid to James 4 times as much as to John. I paid 300 dollars to both. What did I pay to each?

**64.** What number multiplied by 16 will give a product of 400?

**65.** The difference between 280 and 46 is how many times 18?

**66.** If 8 horses are worth 1,000 dollars, how many horses are worth 4,000 dollars?

**67.** Robert does as much work in 2 days as Henry does in 3 days. If Henry gets 90 cents a day, how much should Robert get?

**68.** Two boys together have 63 marbles, and one of them has 15 marbles more than the other. How many marbles has each?

**69.** A man earns 15 dollars a week, and spends 7 dollars a week. In what time will he save 144 dollars?

**70.** A boat runs down stream 8 miles an hour, and after running 14 hours it takes the boat 16 hours to return. What is the rate per hour up stream?

**71.** In one yard there are 36 inches. How many yards are there in 396 inches?

**72.** From 425 dollars I have 50 dollars remaining after paying 15 men equal sums. How much did I pay to each man?

73. How many 25-pound sacks of flour can be taken from 50 barrels, each containing 196 pounds?

74. In how many hours will a cistern, holding 4,500 gallons, be filled by a pipe that carries 50 gallons an hour.

75. If a man had 4 times as many chickens as he now has, and 36 chickens more, he would have 276 chickens. How many chickens has he?

76. The value of 23 sheep and 18 lambs is 169 dollars. If the value of each sheep is 5 dollars, what is the value of each lamb?

77. Twelve times 45 are how many times 15?

78. Five times a number, plus 8 times the number, minus 6 times the number, plus 4 times the number, minus 9 times the number, plus 8 times the number, equals 720. What is the number?

79. Nine times a number multiplied by 8, divided by 12, equals 960. What is the number?

80. Six times Lucy's age multiplied by 15, divided by 18, multiplied by 8, divided by 4, equals 150 years. How old is Lucy?

81. How many oranges can be bought for 90 cents at the rate of 3 for 10 cents?

82. If 12 quinces are worth 29 cents, how many quinces can I get for 87 cents?

83. Bought 30 barrels of flour for 150 dollars. For what must it be sold per barrel in order to gain 90 dollars? What will be the gain on each barrel?

84. If a man gained 275 dollars by selling 11 horses for 125 dollars each, what did each horse cost him?

85. George had 105 apples. He gave 15 to his mother, and shared the remainder equally with 9 playmates. How many did each playmate receive?

86. Albert and Frank had each 40 marbles. After Albert had given Frank 8 marbles, and then bought back 19 marbles, how many marbles had each?

87. Two men together owned 360 acres of land. If the first should sell 95 acres from his share, he would have 25 acres less than the second. How many acres had each man at first?

88. A dealer had 6 bushels of apples. He used 3 bushels and 2 pecks. What is the remainder worth at 15 cents a peck?

89. If a lady pays 50 cents for grapes at the rate of 5 cents for 3 bunches, and sells them at the rate of 6 bunches for 15 cents, how many cents does she gain?

90. A cistern capable of holding 640 gallons is empty. In how many hours can the cistern be filled if it has one pipe leading into it with a capacity of 75 gallons an hour, and another pipe leading out of it with a capacity of 35 gallons an hour, and both pipes are opened?

91. Ralph and Watson each bought 36 marbles. Ralph sold Watson 14, and then Watson sold Ralph 22. How many marbles has each?

92. Six masons build a wall for 128 dollars. Four masons worked 6 days, and 2 masons worked 4 days. How many dollars should each receive?

93. A cistern can be emptied in 18 minutes by 4 pipes. In what time can it be emptied by 6 pipes of the same dimensions?

94. A exchanged 168 tons of coal, worth 4 dollars a ton, for 2 acres of land, worth 66 dollars an acre, and sheep, worth 6 dollars a head. How many sheep did he get?

95. A man saves 15 dollars in each of the 12 months

in a year. In how many years can he save 1,980 dollars?

96. Two men paid 660 dollars for feed. One had 24 sheep, and the other had 36 sheep. How much did each pay?

97. A farmer had 72 turkeys. 2 times the number in one flock, minus 18, equal the number in the other flock. How many are there in each flock?

98. A pole, whose length was 84 feet, was broken into 2 pieces in falling. The length of the longer piece was 2 times that of the shorter piece, plus 12 feet. Required the length of each piece.

99. A party of 30 people have provisions for 4 weeks. How many people must leave, that the provisions may last those who remain 40 days?

100. A drover bought a lot of cows and hogs for 850 dollars. The cows cost 30 dollars each and the hogs 10 dollars each. If there were twice as many hogs as cows, how many were there of each?

## REVIEW PROBLEMS

1. A grammer cost 35 cents, and an arithmetic cost 65 cents. What did both cost?

2. A horse cost 125 dollars, and a cow cost 30 dollars. How much greater was the cost of the horse than the cost of the cow?

3. What number is as much more than 25 as 14 are less than 25?

4. A farmer sold 6 dozen eggs at 18 cents a dozen, and 12 pounds of butter at 25 cents a pound. What was the total amount of the sale?

5. Eight men can do a piece of work in 36 days. How long should it take 9 men to do the work?

6. How many chickens, at 50 cents each, must be exchanged for 24 yards of cloth, at 25 cents a yard?

7. Jane had 50 cents, and spent 20 cents for ice cream and 14 cents for candy. How much money had she left?

8. How many months are there in 7 years?

9. Harry bought a knife for 25 cents, a cap for 45 cents, and some marbles for 14 cents. How much did he spend for all?

10. If 54 apples were divided equally among 9 boys, how many did each boy receive?

11. Mr. Ripple bought a cow for 36 dollars, and sold her for 44 dollars. What did he gain?

12. At 4 dollars a barrel, how many barrels of sweet-potatoes can be bought for the difference between 92 dollars and 48 dollars?

13. If 8 pounds of coffee cost 160 cents, what will 12 pounds cost?

14. I bought 7 yards of cloth at 16 cents a yard, and 8 yards of calico at 8 cents a yard. What was the total cost?

15. Out of every bushel of wheat a miller takes 4 quarts as toll. How many quarts does he take out of 34 bushels?

16. How many quinces can be bought for 84 cents, at the rate of 3 quinces for 7 cents?

17. If 8 are contained in a number 15 times, how many times are 4 contained in it?

18. If a tree 8 feet high casts a shadow 3 feet long, how high must a tree be to cast a shadow 27 feet long?

19. If your slate is 12 inches long and 9 inches wide, how many inches are there around the slate?

**20.** Two men being 620 miles apart, travel toward each other. When the one has traveled 240 miles, and the other 230 miles, how far apart are they?

**21.** If I buy a pound of coffee for 18 cents, and a pound for 24 cents, and mix it, what is the mixture worth a pound?

**22.** What is the distance around a square which measures 14 feet on a side?

**23.** A man exchanged a buggy worth 50 dollars, some turkeys worth 22 dollars, and some chickens worth 16 dollars, for a horse worth 100 dollars. Did he gain or lose, and how much?

**24.** If pencils cost 84 cents a dozen, what is the cost of 1 pencil?

**25.** A having 50 dollars, paid a debt of 26 dollars. How many lambs at 3 dollars each can he buy with the remainder of his money?

**26.** Mr. Ritter earns 840 dollars a year, and spends 45 dollars a month. How much does he save in a month?

**27.** For 30 horses, worth 84 dollars each, a man gave 90 cows. How much were the cows worth a head?

**28.** How many boards, each 12 feet long, will be required to build 720 feet of fence, 5 boards high?

**29.** A robe costs 18 dollars, a buggy 50 dollars more than the robe, and a horse as much as the buggy and the robe together. What was the total cost?

**30.** The wages of a clerk are 15 dollars a week, and his expenses are 7 dollars a week. How long will it take him to pay a debt of 88 dollars, and deposit 40 dollars in bank?

**31.** After the hawks had taken 18 of the farmer's chickens, he sold 46 of them and had 65 left. How many chickens had he at first?

32. The roof of a school-house is 67 feet from the ground, and the top of the steeple is 56 feet above the roof. How far is it from the top of the steeple to the ground?

33. Hattie bought 8 yards of cloth at 16 cents a yard, and received 22 cents change. How much money did she give the merchant?

34. Calvin and Thomas each had 35 chestnuts. If Calvin gave Thomas 14 chestnuts, and then Thomas gave Calvin 18, how many chestnuts had each?

35. If Harry can ride 72 miles in 12 hours, how far can he ride in 96 hours?

36. A man has 90 turkeys. In one flock he has 18, in another 27, in another 24, and the balance in a fourth flock. How many turkeys are there in the fourth flock?

37. What will 14 quarts of berries cost at 12 cents a quart?

38. If 4 lemons are worth 9 apples, how many apples are 16 lemons worth?

39. A man earns 9 dollars while his boy earns 4 dollars. How many dollars have they together earned when the man has earned 45 dollars?

40. How many men will it require to do a piece of work in 6 days, when 9 men can do it in 8 days?

41. If 7 men earn 84 dollars in 4 days, how much does each man earn in a day?

42. The sum of two numbers is 78, and their difference is 14. What are the numbers?

43. If 6 men can do a piece of work in 12 days, how many men will it take to do 3 times as much work in 24 days?

44. I traded 20 chickens, worth 40 cents each, for

ducks, worth 50 cents each. How many ducks did I get?

45. If a clerk receives a salary of 1,000 dollars a year, and spends 2 dollars a day for 365 days, how much has he left at the close of the year?

46. A man bought 20 cows at 30 dollars each. He sold 10 of the cows at 40 dollars each, and 10 of them at 25 dollars each. How many dollars did he gain?

47. If Lucy is 14 years old, and her mother is 28 years older, and her grandmother is 38 years older than her mother, what is the sum of their ages?

48. The smaller of two numbers is 125, and their difference is 88. What is the larger number?

49. The product of three factors is 160, and two of the factors are 4 and 5. What is the other factor?

50. A butcher killed 4 hogs, the total weight of which was 960 pounds. What was their average weight?

51. If a stage coach runs 63 miles in 7 hours, in how many hours will it run 72 miles?

52. The sum of three numbers is 80. One of the numbers is 24 and another is 29. What is the third?

53. The difference between two numbers is 39, and the larger is 85. What is their sum?

54. The product of two numbers is 228, and one of the numbers is 12. What is the other?

55. The sum of two numbers is 39, and the smaller is 12. What is their product?

56. A tree 85 feet high had 47 feet of the top broken off. How high was the remainder of the tree?

57. The Dead Sea is 700 feet deep, and the Great Salt Lake is 60 feet deep. How much deeper is the Dead Sea than the Great Salt Lake?

58. The St. Lawrence River is 2,000 miles long, and

the Hudson is 350 miles long. How much longer is the St. Lawrence than the Hudson?

59. If 8 bushels of wheat are worth 16 dollars, how many bushels of wheat must be given for 8 tons of hay worth 12 dollars a ton?

60. Two men travel in opposite directions; one at the rate of 28 miles a day, and the other at the rate of 36 miles a day. How far apart are they at the end of 9 days?

61. How many hours are there in the month of April?

62. From a jug holding 4 gallons of vinegar, 5 quarts were taken. How many quarts remained?

63. What will 3 bushels of plums cost, if a peck of plums cost 35 cents?

64. What numbers multiplied together will produce 51?

65. If 8 men can do a certain piece of work in 24 days, how long will it take 32 boys to do the same work, provided 1 man does as much work as 2 boys?

66. If buttons cost 7 cents a dozen, how many buttons can be bought for 63 cents?

67. I paid 285 dollars for a piano, and sold it so as to gain 75 dollars. What was the selling price?

68. A man bought a horse and two cows for 172 dollars. One cow cost 32 dollars and the other 45 dollars. What was the cost of the horse?

69. At 60 cents a day, how much money can I earn during this month?

70. The ages of three boys are 14, 16 and 18 years. What is their average age?

71. In an orchard there are 21 rows of trees, and 12 trees in a row. How many trees are there in the orchard?

72. Seventy-two dollars are divided equally among 12 boys. How many dollars does each boy receive?

73. Andrew bought 6 horses for 75 dollars each, and 7 horses for 69 dollars each. If he sold them all for 80 dollars each, what did he gain?

74. Of what number is 15 both the divisor and the quotient?

75. I bought 15 horses at 90 dollars a head. At what price per head must I sell them to gain 240 dollars?

76. Mattie's age, increased by 12 years, equals 28 years. How old is she?

77. Four times the length of a rope, diminished by 24 feet, equals once its length. How long is the rope?

78. Frank and Albert had 24 marbles. How many had each, if Frank had twice as many marbles as Albert?

79. Hattie has 15 cents more than Ruth, and they together have 75 cents. How many cents has each?

80. Mr. Fox gave the same amount of money to each of his two boys. After one boy spent 16 cents, and the other spent 12 cents, they together had 62 cents. How many cents did Mr. Fox give to each boy?

81. There are 9 girls and 5 boys in the A class, and 8 girls and 7 boys in the B class. How many girls are there in the two classes? How many boys?

82. From the quotient of 100 divided by 5 subtract 10, add 5 to the remainder, divide the sum by 3, and name the result?

83. There are 365 days in a common year. If 52 of them are Sundays, how many are working days?

84. If 20 bushels of oats are worth 5 bushels of wheat, how many bushels of oats are worth 3 bushels of wheat?

85. If H is 13 miles east of M, and U is 29 miles west from M, how far is it from H to U?

86. If 16 people use 48 sacks of flour in 1 year, how many sacks will 3 people use in 3 years?

87. What is the difference between the quotient of 252 divided by 9, and the product of 9 times 4?

88. There are 24 sheep in the first field, and 14 in the second. If 10 sheep jump from the first field into the second, and then 5 of them jump back, how many sheep are in each field?

89. If 4 horses eat 8 tons of hay in a certain time, how many tons will 12 horses eat in twice the time?

90. A, B and C went hunting. A shot 8 ducks, B 10, and C 6. If they divide them equally, how many ducks will each have?

91. John is 14 years old, and James is 5 times as old. In 5 years from now how many years older than John will James be?

92. A and B, who are 288 miles apart, approach each other. A. travels at the rate of 5 miles an hour, and B at the rate of 7 miles an hour. In how many hours will they meet, and how far will each have traveled?

93. A man buys 8 oranges at one place, 9 at another, and 16 at another. If he divides them equally among 11 children, how many oranges does each child receive?

94. If 6 men can do a piece of work in 4 days, how many days will it take 4 men to do it?

95. Bella is 15 years older than Rose, and Julia is 24 years older than Rose. Which is the older, Bella or Julia, and how many years older?

96. Irvin is 24 years old. Harley is 5 years younger than Irvin, and 7 years older than Lee. Irvin is how many years older than Lee?

# UNITED STATES MONEY

The legal currency of the United States is based upon the decimal system; that is, ten units of a lower order make one of the next higher.

TABLE

| | | |
|---|---|---|
| 10 mills (m.) | equal | 1 cent (ct.). |
| 10 cents | " | 1 dime (d.). |
| 10 dimes (or 100 cts.) | " | 1 dollar ($). |

**Dollars** and **cents** are generally used in business transactions, and when written in figures, are separated by a decimal point (.). Thus, $8.45 is read 8 dollars and 45 cents.

1. How many mills are there in 3 cents? In 8 cents? In 14 cents?

2. How many cents are there in 40 mills? In 70 mills? In 90 mills?

3. How many cents are there in 6 dimes? In 14 dimes? In $2?

4. How many dimes are there in $6? In $8? In $13? In $17?

5. How many dollars are there in 30 dimes? In 70 dimes? In 400 cents?

6. How many cents are there in $1.25? In $4.02? In $8.50? In 1,000 mills?

7. How many dollars are there in 325 cents? In 102 cents? In 963 cents?

8. How many mills are there in 10 cents? In 4 dimes? In $6?

9. How many cents are there in a nickel? In a quarter of a dollar?

10. A goose cost 85 cents, and a duck cost 48 cents. How many cents did both cost?

11. I bought some sugar for 85 cents, and some butter for 55 cents. How many cents did I pay for both?

12. Harry paid 95 cents for a book, and 15 cents for a tablet. How much money did he spend?

13. If a horse cost $135, and a wagon cost $45, how much did both cost?

14. I bought a suit for $16.50, and a hat for $2.50. How much did both cost?

15. I bought a pair of skates for 75 cents, and sold them for 90 cents. How much did I gain?

16. If a merchant bought cloth for $1.25 a yard, and sold it for $1.63, what was the gain?

17. Frank paid $3 for a pair of shoes, and $2.25 for a hat. How much more did he pay for the shoes than for the hat?

18. If I give a 5-dollar bill in payment for a turkey that cost $2.25, how much change shall I receive?

19. Henry received $50, and paid $15.50 for board and $11.75 for other expenses. How much did he have left?

20. If John earns 50 cents a day, how much money will he earn in 8 days?

21. What will 4 cords of wood cost at $4.75 a cord?

22. If 1 pound of coffee cost 22 cents, what will 6 pounds cost?

23. A farmer sold 6 pounds of butter at 28 cents a pound, and 5 dozen eggs at 18 cents a dozen. What was the amount of the sale?

24. How many pounds of sugar, at 8 cents a pound, can I buy for 56 cents? For 72 cents? For $3.36?

25. How many oranges, at 3 cents each, can I buy for 90 cents? For $1.38? For $3?

26. If 50 sheep cost $200, what does 1 sheep cost?

27. Andrew worked 6 days for $4.20. How many days must he work to earn $11.20?

28. How many cents are there in 6 nickels and 8 cents?

29. How many cents are there in 2 quarters, 2 dimes, and 2 nickels?

30. If I have 5 half-dollars and 3 quarters, how much money have I?

31. Which would you rather have, $3 or 11 quarters? Why?

32. Mrs. Jones paid $2 and 4 dimes to one merchant, and $5 and 1 quarter to another merchant. How much money did she pay to both?

33. Having a number of 1, 5, 10, 25, and 50-cent pieces, how would you make the change for 25 cents out of $1? For 83 cents out of $2? For $4.08 out of $5?

34. Having all the pieces of money in current use, how would the change be counted for $8.46 out of $10? For $5.72 out of $7? For $2.97 out of $5?

35. How should the change be counted in taking $14.98 out of $20?

36. How much money will it require to buy 15 horses at $112 apiece and have $420 left?

37. A lawyer bought 9 acres of land for $1,125, and sold it for $1,440. How much did he gain per acre?

38. If 4 yards of cloth cost 8 dimes, how many yards can be bought for $2?

39. At 24 cents a quart, what is the cost of 40 gallons of molasses?

40. How many $50 bills are equivalent to one $500 bill?

41. At the rate of 3 bananas for 5 cents, how many bananas can be bought for 60 cents?

42. How much money will James have left out of a $100 note after buying 30 lambs at $3.15 each?

43. A and B have $125, and A has $25 more than B. How many dollars has each?

44. I bought a mileage book containing 1,000 miles at the rate of 2 cents a mile. After using it for some time, I sold it at the same rate for $15.84. How many miles did I use out of it?

45. The value of 7 horses and 5 cows is $1,080. The value of each horse is $130. What is the value of each cow?

46. A sheep cost $7.50, a cow cost 4 times as much as the sheep, and a horse cost 4 times as much as the cow. What was the entire cost?

47. A man bought a horse for $166, which was $18 less than twice what he paid for a buggy. What did he pay for the buggy?

48. Ten dozen tablets cost $7.20. If they were retailed at 8 cents each, how much was gained by the transaction?

49. What is the difference between the cost of 40 pounds of coffee at 32 cents a pound, and 150 pounds of sugar at 9 cents a pound?

50. If I had $72 more I could buy 12 hogs at $15 each, but I spend my money for cows at $36 each. How many cows do I buy?

51. Hattie bought 8 yards of cloth at 16 cents yard, and received 22 cents change. How much money did she give the clerk?

52. A man bought 300 sheep at $3 a head, paid $100 to get them to market, and sold them at $4 a head. Did he gain or lose, and how much?

53. A man had 1 fifty, 1 twenty-five, 2 ten, 3 five, and 4 one-cent pieces. How much money had he?

54. A man bought a horse for $80, a buggy for $75, and a set of harness for $15. If he gave in payment $50 in money, and his check for the balance, what was the amount of the check?

55. A woman took to the store 5 pounds of butter, worth 15 cents a pound, and 10 dozen eggs, worth 12 cents a dozen. She bought 20 pounds of sugar at 6 cents a pound, 2 pounds of coffee at 15 cents a pound, and 5 yards of calico at 6 cents a yard. How much money must she receive to balance the account?

56. A bought a horse for $100, and paid $2 a week for his keeping. At the end of 10 weeks he received $50 for work which the horse did. The animal was then sold for $90. Did A gain or lose, and how much?

57. A man divided $1.50 equally among 10 boys. If 8 of the boys put their money together and buy a ball, and the other 2 boys put their money together and buy a bat, what is the cost of each?

58. A boy pays 60 cents for 30 oranges. If he sells 20 of them at 5 cents each, and the remainder at 1 cent each, how much does he gain?

59. Are lemons cheaper at 24 cents a dozen, or at 15 cents for 5?

60. A boy bought 5 dozen oranges at 36 cents a dozen, gave away 8, ate 4, and then sold the rest at 4 cents each. Did he gain or lose, and how much?

61. Henry invested 20 cents in papers at 2 for 1 cent, and sold them at 2 cents each. What was his gain?

62. John and James each received $1. If John paid 35 cents for a knife, and 25 cents for a necktie, and

James paid 50 cents for a pair of skates, which had the more money, and how much had he?

63. A man traded 5 bushels of wheat, worth 80 cents a bushel, for 20 bushels of oats. What was the oats worth a bushel?

64. A farmer took to the store 10 pounds of butter worth 20 cents a pound, and bought 4 pounds of coffee at 20 cents a pound, and sugar at 6 cents a pound for the balance. How many pounds of sugar did he get?

65. Is it better to buy a horse for $100, and sell him for $110, or to buy one for $80, and sell him for $95?

66. John has 35 cents, and Harry has 65 cents. How much must Harry give to John so that they shall have equal sums?

67. A man bought 7 pounds of rice at 9 cents a pound, and gave 3 25-cent pieces in payment. How much change should he receive?

68. Mr. Fisher gave to each of 9 boys 14 cents, and had 24 cents remaining. How many cents had he at first?

69. A boy buys 50 papers a day at 1 cent each, and sells them at 3 cents each. How much does he earn in a week?

70. A shoeblack earned $1.20 in one day. If he charged 10 cents a pair, how many pairs of shoes did he blacken?

71. A man bought a wagon for $50, paid $25 for having it repaired, and then sold it for $70. Did he gain or lose, and how much?

72. If a boy gains 2 cents on an investment of 1 cent, how much will he gain on an investment of 75 cents at the same rate?

73. If 8 apples cost 16 cents, what will 12 apples cost?

74. A boy buys 24 apples at the rate of 3 for 5 cents, and 24 oranges at the rate of 2 for 5 cents. If he sells all of them at 2 cents each, how many cents does he gain or lose?

75. A man having $1 wishes to divide it among 8 boys and 4 girls. If he divides 96 cents equally among all of them, and then divides the remainder among the girls, how much will each girl and each boy receive?

76. Ammon has 25 cents, and Heaton has 20 cents. With their money they buy 9 oranges, and have no money remaining. How much did they pay for each orange, and how many oranges did each receive?

77. If 5 oranges are worth 10 apples, and 6 apples are worth 12 cents, what will 7 oranges cost?

78. If 9 pounds of sugar can be bought for 54 cents, how many pounds of sugar can be bought with 8 pounds of butter at 12 cents a pound?

79. If 5 dozen eggs are worth 75 cents, how many yards of calico worth 5 cents a yard can be bought for 3 dozen eggs?

80. If 5 yards of cloth cost $10, what will 2 yards cost at the same rate?

81. If it takes 5 bushels of wheat to make 1 barrel of flour (196 pounds), how many barrels of flour can be made from 25 bushels of wheat, and what will the flour be worth at $4.90 per barrel?

82. A man has $50, with which he buys 15 pigs, and has $5 left. How much does he pay for each pig?

83. Mr. Jones bought 15 pigs and 10 sheep for $115, paying $1 apiece more for the pigs than for the sheep. How much does he pay for each?

84. If 9 sheep are worth $54, and 10 pigs are worth $40, how many sheep are worth as much as 18 pigs?

# COMMON FRACTIONS

1. When an apple is cut into two equal pieces, what part of the whole apple is each piece?

2. How many halves are there in 1 apple?

3. What is 1 half of 6 cents?

SOLUTION.—One half of 6 cents is 6 divided by 2, or 3 cents.

4. What is 1 half of two books? Of 4 boys? Of 8 oranges?

5. What is 1 half of 10 chestnuts? Of 14 marbles? Of $12?

6. What is 1 half of 16 horses? Of 20 pencils? Of 18 flowers?

7. If a pound of sugar costs 6 cents, how much will 1 half of a pound cost?

8. Frank gave 1 half of 12 marbles to his sister. How many marbles did he give her?

9. Harry had 30 plums, and gave 1 half of them away. How many plums did he keep?

10. How many cents are there in 1 half of a dollar?

11. When an apple is cut into 3 equal pieces, what part of the whole apple is each piece?

12. What part of the whole apple are 2 of these pieces?

13. How many thirds are there in 1 apple? In 1 orange?

14. What is 1 third of 6 slates? Of 12 pencils? Of 15 marbles?

15. What is 1 third of 18 cents? Of 30 sticks? Of 24 chickens?

16. What is 1 third of 21 marks? Of 27 marks? Of 33 marks?

17. If a boy can ride his bicycle 9 miles in 1 hour, how far can he ride in 1 third of an hour?

18. How many inches are there in 1 third of a yard?

19. If a pound of tea costs 60 cents, what will 1 third of a pound cost?

20. Mr. White is 75 years old, and his son is 1 third as old. How old is his son?

21. In 1 month Andrew earned 1 third of $54. How many dollars did he earn?

22. How many are 2 thirds of 9 peaches?

SOLUTION.—One third of 9 peaches is 3 peaches, and 2 thirds of 9 peaches are 2 times 3 peaches, or 6 peaches.

23. How many are 2 thirds of 6 marbles? Of 21 marbles? Of 39 marbles?

24. How many are 2 thirds of 18 boys? Of 36 boys? Of 54 boys?

25. I bought 45 sheep, and sold 2 thirds of them. How many did I sell?

26. A man earned $63, and spent 2 thirds of it. How much did he spend?

27. A cow cost 2 thirds of $57. How many dollars did she cost?

28. Jennie has 87 cents, and Ruth has 2 thirds as many. How many cents has Ruth?

29. When an apple is cut into 4 equal pieces, what part of the whole apple is each piece?

30. What part of the whole apple are 2 of these pieces? 3 of these pieces?

31. How many fourths are there in 1 apple? In 1 pear?

32. What is 1 fourth of 20 cents? Of 16 cents? Of 24 cents?

33. What is 1 fourth of 8 boys? Of 28 boys? Of 32 boys? Of 40 boys?

34. How many eggs are there in 1 fourth of 3 dozen?

35. How many cents are there in 1 fourth of $1?

36. George has $60, and Willie has 1 fourth as many. How many dollars has Willie?

37. I sold a horse for $92, and gained 1 fourth of this amount. How many dollars did I gain?

38. How many are 2 fourths of 12 roses? Of 36 girls? Of 52 birds? Of 60 marbles?

39. How many are 3 fourths of $40? Of 56 cents? Of 76 desks? Of 92 pinks?

40. If 1 pound of rice costs 8 cents, what will 1 fourth of a pound cost?

41. What will 2 fourths of a pound of rice cost?

42. What will 3 fourths of a pound of rice cost?

43. A paid 3 fourths of $160 for a horse. How much money did the horse cost?

44. In a school-building there were 140 pupils. If 3 fourths of them were girls, how many girls were there?

45. Morgan had 3 fourths of 72 marbles, Ralph had 2 thirds of 84, and John had 1 half of 98. How many marbles had each?

46. How many fifths are there in 1 orange? In 1 apple? In 1 sheet of paper?

47. What is 1 fifth of 15 apples? Of 65 apples? Of 140 apples? Of 165 oranges?

48. Clement paid $35 for a watch, and 1 fifth as much for a chain? What did he pay for the chain?

49. How many are 2 fifths of $10? Of $50? Of $100? Of $75?

50. How many are 3 fifths of 20 chestnuts? Of 35 chestnuts? Of 60 chestnuts?

51. How many are 4 fifths of 30 marbles? Of 45 marbles? Of 70 marbles?

52. Henry earned 2 fifths of $120. How much money did he earn?

53. A farmer had 100 bushels of oats. He sold 2 fifths of it to one man, and 3 fifths of it to another. How many bushels did he sell to each man?

54. If a field is worth $400, what are 4 fifths of it worth?

55. Mrs. Brown's age is 55 years. If her sister's age is 4 fifths as many years, what is her sister's age?

56. How many sixths are there in 1 lemon? In 1 apple? In 1 line?

57. What is 1 sixth of 18 robins? Of 54 robins? Of 108 robins? Of 132 robins?

58. How many are 5 sixths of 36 plums? Of 60 plums? Of 150 plums?

59. If a roll of carpet is worth $72.48, what is 1 sixth of the roll worth?

60. If a piece of work can be done in 102 days, how many days will it take to do 1 sixth of it? To do 2 sixths of it? To do 1 half of it? To do 4 sixths of it?

61. Mr. Neff has 42 acres of wheat and 5 sixths as many acres of corn. How many acres of corn has he?

62. How many sevenths are there in 1 circle? In 1 orange? In 1 apple?

63. What is 1 seventh of 14 cents? Of 35 cents? Of $1.12? Of $1.54?

64. How many are 2 sevenths of $28? Of $84? Of $175? Of $224?

65. How many are 4 sevenths of 49? Of 105? Of 210? Of 245?

66. How many are 3 sevenths of 42? Of 91? Of 189?

**67.** How many are 5 sevenths of 56? Of 119? Of 238? Of 266?

**68.** How many are 6 sevenths of 21? Of 63? Of 161? Of 189?

**69.** A piece of carpet is 252 inches long, and its width is 1 seventh of its length. How many inches wide is it?

**70.** What will 2 sevenths of 42 pounds of coffee cost at 18 cents a pound?

**71.** If 3 sevenths of $63 are $25 less than the cost of a wagon, what is the cost of the wagon?

**72.** Robert worked 72 hours, and Albert worked 5 sevenths as long. How long did Albert work?

**73.** If a lady spent 4 sevenths of $126, how many dollars did she spend?

**74.** A measure holds 20 more than 6 sevenths of 84 apples. How many apples does the measure hold?

**75.** How many eighths are there in 1 line? In 1 lemon? In 1 pear?

**76.** What is 1 eighth of $16? Of $48? Of $96?

**77.** How many are 3 eighths of 24? Of 80? Of 168?

**78.** How many are 5 eighths of 32? Of 120? Of 184? Of 200?

**79.** How many are 7 eighths of 40? Of 72? Of 136?

**80.** If a bushel of corn cost 7 eighths of 64 cents, and a bushel of potatoes cost 5 eighths of 48 cents, how many cents will a bushel of each cost?

**81.** How many ninths are there in 1 unit?

**82.** What is 1 ninth of 18 girls? Of 90 girls? Of 135 girls? Of 171 girls?

**83.** How many are 2 ninths of 45? Of 81? Of 126?

**84.** How many are 4 ninths of 27? Of 72? Of 144?

**85.** How many are 5 ninths of 36? Of 63? Of 162?

**86.** How many are 7 ninths of 54? Of 99? Of 180?

87. There are 63 gallons in 1 hogshead. How many gallons are there in 8 ninths of a hogshead?

88. Herbert rode 180 miles, and walked 5 ninths as far. How many miles did he travel?

89. 7 ninths of 162 are how many times 3 eighths of 16?

90. If Edward gave 3 fourths of $1 for a hat, and 1 fifth of $1 for a necktie, how many cents did he spend?

91. How many minutes are there in 1 half of an hour? In 2 thirds of an hour? In 3 fourths of an hour? In 4 fifths of an hour? In 5 sixths of an hour?

92. What is the sum of 7 ninths of 117 and 5 eighths of 96?

93. Grant, having 54 marbles, gave 2 ninths of them to one brother, and 1 third of them to another brother. How many had he left?

94. A pole 96 feet long is planted in the ground; 3 eighths of its length, less 27 feet, equals the length in the ground. Required, the length in the air?

95. If 7 ninths of 135 years are 5 times Annie's age, how old is she?

96. A drover had 360 sheep, and sold 2 ninths to one party, 3 ninths to another, and 1 sixth to another. How many sheep had he left?

97. A huckster, having 168 turkeys, sold 4 sevenths of them on Monday, and 3 fourths of the remainder on Tuesday. How many turkeys did he then have?

98. Lake Erie is 120 feet deep, and Great Salt Lake is 1 half as deep. How deep is Great Salt Lake?

99. John Adams was 90 years old, and his son, John Quincy, was 8 ninths as old. How old was John Quincy Adams?

100. Daniel Webster was 7 ninths as old as John Adams. How old was Webster?

# REDUCTION

1. How many halves are there in 1 apple? How many thirds? How many fourths?

2. How many halves are there in 4 quinces?

SOLUTION.—In 1 quince there are 2 halves, and in 4 quinces there are 4 times 2 halves, or 8 halves?

3. How many halves are there in 3? In 5? In 7?

4. How many thirds are there in 4? In 6? In 7?

5. How many fourths are there in 2? In 5? In 9?

6. How many fifths are there in 3? In 6? In 8?

7. How many sixths are there in 2? In 7? In 10?

8. How many sevenths are there in 4? In 6? In 9?

9. How many eighths are there in 3? In 7? In 11?

10. How many ninths are there in 4? In 7? In 9?

11. How many thirds are there in 4 and 2 thirds?

SOLUTION.—In 1 there are 3 thirds, and in 4 there are 4 times 3 thirds, or 12 thirds; 12 thirds and 2 thirds are 14 thirds. Therefore, in $4\frac{2}{3}$ there are $\frac{14}{3}$.

12. How many halves are there in $2\frac{1}{2}$? In $4\frac{1}{2}$? In $8\frac{1}{2}$?

13. How many fifths are there in 3? In $4\frac{1}{5}$? In $6\frac{3}{5}$?

14. How many fourths are there in 4? In $5\frac{3}{4}$? In $9\frac{1}{4}$?

15. How many sixths are there in 4? In $3\frac{5}{6}$? In $6\frac{1}{6}$?

16. How many eighths are there in 8? In $4\frac{3}{8}$? In $7\frac{5}{8}$?

17. How many sevenths are there in 5? In $3\frac{2}{7}$? In $6\frac{5}{7}$?

18. How many ninths are there in 3? In $2\frac{1}{9}$? In $3\frac{4}{9}$?

19. Reduce to ninths: $4\frac{2}{3}$, $5\frac{2}{3}$, $7\frac{5}{9}$, $6\frac{7}{9}$.

20. Reduce to improper fractions: $3\frac{1}{2}$, $5\frac{1}{3}$, $8\frac{2}{5}$, $4\frac{4}{7}$.

21. Reduce to improper fractions: $7\frac{5}{6}$, $4\frac{1}{8}$, $2\frac{3}{5}$, $9\frac{3}{8}$.

22. Reduce to improper fractions: $5\frac{3}{4}$, $6\frac{4}{5}$, $9\frac{5}{6}$, $8\frac{6}{7}$.

23. How many 1's are there in $\frac{7}{2}$?

SOLUTION.—In 1 there are 2 halves, and in $\frac{7}{2}$ there are as many 1's as 2 are contained times in 7, or $3\frac{1}{2}$.

24. How many 1's are there in $\frac{6}{2}$? In $\frac{12}{3}$? In $\frac{15}{4}$?
25. How many 1's are there in $\frac{24}{6}$? In $\frac{14}{7}$? In $\frac{52}{9}$?
26. How many 1's are there in $\frac{18}{2}$? In $\frac{65}{5}$? In $\frac{88}{8}$?
27. How many 1's are there in $\frac{9}{3}$? In $\frac{24}{4}$? In $\frac{84}{7}$?
28. How many 1's are there in $\frac{25}{5}$? In $\frac{56}{8}$? In $\frac{81}{9}$?
29. How many 1's are there in $\frac{24}{2}$? In $\frac{18}{3}$? In $\frac{52}{9}$?
30. How many 1's are there in $\frac{36}{4}$? In $\frac{42}{6}$? In $\frac{38}{7}$?
31. Reduce to whole numbers: $\frac{48}{4}$, $\frac{21}{7}$, $\frac{42}{7}$, $\frac{56}{8}$.
32. Reduce to whole numbers: $\frac{35}{7}$, $\frac{63}{9}$, $\frac{48}{6}$, $\frac{32}{8}$.
33. Reduce to whole or mixed numbers: $\frac{36}{9}$, $\frac{42}{8}$, $\frac{27}{5}$.
34. Reduce to whole or mixed numbers: $\frac{57}{6}$, $\frac{56}{7}$, $\frac{50}{8}$.
35. Reduce to whole or mixed numbers: $\frac{14}{3}$, $\frac{60}{7}$, $\frac{63}{9}$.
36. Reduce to whole or mixed numbers: $\frac{27}{5}$, $\frac{49}{7}$, $\frac{47}{9}$.
37. Reduce to mixed numbers: $\frac{23}{7}$, $\frac{80}{9}$, $\frac{82}{5}$, $\frac{45}{8}$.
38. Reduce to mixed numbers: $\frac{70}{9}$, $\frac{21}{6}$, $\frac{25}{8}$, $\frac{55}{9}$.
39. Reduce to mixed numbers: $\frac{55}{9}$, $\frac{75}{8}$, $\frac{64}{7}$, $\frac{28}{3}$.
40. Reduce to mixed numbers: $\frac{27}{5}$, $\frac{27}{4}$, $\frac{85}{9}$, $\frac{100}{6}$.
41. How many weeks are there in 24 days?
42. How many years are there in 28 months?
43. How many gallons are there in 37 quarts?
44. How many yards are there in 26 feet?
45. If a boy rides 9 miles an hour, how long will it take him to ride 75 miles?
46. If 4 cords of wood cost $20, how many dollars does 1 cord cost?
47. At 9 cents a pound, how many pounds of meat can be bought for 50 cents?
48. If 20 acres are divided into 8 equal lots, how many acres are there in each lot?
49. In a peck there are 8 quarts. How many pecks are there in 76 quarts?
50. If 1 ton of coal costs $4, how many tons can be bought for $42?

51. How many sixths are there in $\frac{1}{2}$?

SOLUTION.—In 1 there are $\frac{6}{6}$, and in $\frac{1}{2}$ there are $\frac{1}{2}$ of $\frac{6}{6}$, or $\frac{3}{6}$.

52. How many fourths are there in $\frac{1}{2}$?
53. How many sixths are there in $\frac{1}{3}$?
54. How many ninths are there in $\frac{1}{3}$?
55. How many eighths are there in $\frac{1}{2}$? In $\frac{1}{4}$?
56. How many tenths are there in $\frac{1}{2}$? In $\frac{1}{5}$?
57. How many twelfths are there in $\frac{1}{3}$? In $\frac{1}{4}$?
58. How many sixteenths are there in $\frac{1}{2}$ In $\frac{1}{8}$?
59. Reduce $\frac{2}{3}$ to ninths.

SOLUTION.—One third equals $\frac{3}{9}$, and $\frac{2}{3}$ equal 2 times $\frac{3}{9}$, or $\frac{6}{9}$.

60. Reduce $\frac{3}{4}$ to eighths.
61. Reduce $\frac{2}{5}$ to tenths.
62. Reduce $\frac{2}{3}$ to twelfths.
63. Reduce $\frac{2}{3}$, $\frac{4}{5}$ to fifteenths.
64. Reduce $\frac{3}{4}$, $\frac{6}{8}$ to sixteenths.
65. Reduce $\frac{2}{3}$, $\frac{5}{6}$, $\frac{7}{9}$ to eighteenths.
66. Reduce $\frac{3}{4}$, $\frac{4}{5}$, $\frac{9}{10}$ to twentieths.
67. Reduce $\frac{7}{8}$, $\frac{11}{12}$ to twenty-fourths.
68. Reduce $\frac{9}{10}$, $\frac{11}{15}$ to thirtieths.

69. By what number must both the numerator and the denominator of $\frac{1}{2}$ be multiplied to reduce the fraction to $\frac{3}{8}$?

70. By what number must both the numerator and the denominator of $\frac{3}{4}$ be multiplied to reduce the fraction to eighths? To twelfths? To sixteenths?

71. By what number must both the numerator and the denominator of $\frac{5}{6}$ be multiplied to reduce the fraction to twelfths? To eighteenths? To twenty-fourths?

72. Reduce $\frac{6}{7}$ to fourteenths. To forty-secondths. To fifty-sixths. To sixty-thirds.

73. Reduce $\frac{7}{8}$ to sixteenths. To fortieths. To sixty-fourths. To seventy-seconds.

74. Reduce $\frac{10}{11}$ to forty-fourths. To fifty-fifths.

75. Reduce $\frac{1}{2}$ and $\frac{2}{3}$ to their least common denominator.

SOLUTION.—The least common denominator of halves and thirds is sixths. One half equals $\frac{3}{6}$, and $\frac{2}{3}$ equal $\frac{4}{6}$.

76. Reduce $\frac{1}{2}$ and $\frac{1}{4}$ to their least common denominator.

77. Reduce $\frac{1}{3}$ and $\frac{1}{5}$ to their least common denominator.

78. Reduce $\frac{3}{4}$ and $\frac{1}{6}$ to their least common denominator.

79. Reduce $\frac{3}{5}$ and $\frac{2}{7}$ to their least common denominator.

80. Reduce $\frac{2}{3}$ and $\frac{5}{8}$ to their least common denominator.

81. Reduce $\frac{5}{6}$ and $\frac{4}{9}$ to their least common denominator.

82. Reduce $\frac{4}{7}$ and $\frac{9}{10}$ to their least common denominator.

83. Reduce $\frac{5}{9}$ and $\frac{7}{12}$ to their least common denominator.

84. Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ to their least common denominator.

85. Reduce $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{5}$ to their least common denominator.

86. Reduce $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{6}$ to their least common denominator.

87. Reduce $\frac{1}{6}$, $\frac{2}{7}$ and $\frac{1}{8}$ to their least common denominator.

88. Reduce $\frac{1}{7}$, $\frac{5}{8}$ and $\frac{1}{9}$ to their least common denominator.

89. Reduce $\frac{1}{9}$, $\frac{1}{10}$ and $\frac{3}{4}$ to their least common denominator.

90. Reduce $\frac{5}{6}$, $\frac{2}{7}$ and $\frac{1}{12}$ to their least common denominator.

91. Reduce $\frac{1}{11}$, $\frac{5}{6}$ and $\frac{2}{3}$ to their least common denominator.

92. How many thirds are there in $\frac{6}{9}$?

SOLUTION.—Since $\frac{1}{3}$ equals $\frac{3}{9}$, there are as many thirds in $\frac{6}{9}$ as 3 are contained times in 6, or 2. Therefore there are $\frac{2}{3}$ in $\frac{6}{9}$.

93. How many halves are there in $\frac{3}{4}$? In $\frac{8}{8}$? In $\frac{15}{16}$?

94. How many thirds are there in $\frac{3}{9}$? In $\frac{6}{9}$? In $\frac{10}{12}$?

95. How many fourths are there in $\frac{4}{8}$? In $\frac{9}{12}$? In $\frac{15}{20}$?

96. How many fifths are there in $\frac{5}{10}$? In $\frac{12}{15}$? In $\frac{10}{25}$?

97. How many sixths are there in $\frac{12}{12}$? In $\frac{18}{18}$? In $\frac{36}{24}$?

98. How many sevenths are there in $\frac{13}{14}$? In $\frac{35}{28}$? In $\frac{35}{42}$?

99. How many eighths are there in $\frac{12}{16}$? In $\frac{24}{32}$? In $\frac{48}{56}$?

100. How many ninths are there in $\frac{6}{18}$? In $\frac{15}{27}$? In $\frac{24}{36}$?

101. How many tenths are there in $\frac{14}{20}$? In $\frac{24}{40}$? In $\frac{56}{80}$?

102. How many twelfths are there in $\frac{14}{24}$? In $\frac{54}{72}$?

103. By what number must both the numerator and the denominator of $\frac{8}{6}$ be divided to reduce the fraction to $\frac{4}{3}$?

104. By what number must both the numerator and the denominator of $\frac{15}{20}$ be divided to reduce the fraction to fourths?

105. By what number must both the numerator and the denominator of $\frac{30}{36}$ be divided to reduce the fraction to sixths?

106. By what number must both the numerator and the denominator of $\frac{77}{99}$ be divided to reduce the fraction to its lowest terms?

107. Reduce $\frac{28}{40}$ and $\frac{35}{40}$ to their lowest terms.

108. Reduce $\frac{16}{36}$ and $\frac{40}{65}$ to their lowest terms.

109. Reduce $\frac{56}{84}$ and $\frac{63}{72}$ to their lowest terms.

110. Reduce $\frac{42}{84}$ and $\frac{72}{96}$ to their lowest terms.

111. Reduce $\frac{40}{91}$ and $\frac{75}{65}$ to their lowest terms.

112. Reduce to their lowest terms: $\frac{75}{95}$, $\frac{35}{100}$, $\frac{125}{150}$.

113. If a sheep cost $\frac{3}{12}$ of \$12, how many dollars did it cost?

114. If I bought a watch for \$45, and sold it for $\frac{28}{36}$ of the cost, at what price was it sold?

115. A man having 56 turkeys, sold $\frac{20}{40}$ of them to

one dealer, and $\frac{12}{28}$ of the remainder to another dealer. How many did he keep?

116. Mary having 24 pins lost $\frac{14}{21}$ of them, and then found $\frac{9}{14}$ of what she had lost. How many pins had she then?

117. Twenty-eight thirty-fifths of 40 marbles are 4 times the number Harry has. How many marbles has Harry?

118. A horse cost \$100, and a cow cost $\frac{13}{40}$ as much. How much money did the cow cost?

119. Frank had 18 chestnuts, and George gave him $\frac{12}{27}$ as many more. How many chestnuts had he then?

120. Fifteen eighteenths of the days of April are how many days? How many hours?

## ADDITION

1. How many halves are there in $\frac{1}{2}$ of an apple and $\frac{1}{2}$ of an apple? How many whole apples?

2. How many thirds are there in $\frac{1}{3}$ of an orange and $\frac{2}{3}$ thirds of an orange?

3. How many fourths are there in $\frac{2}{4}$ of a dollar and $\frac{2}{4}$ of a dollar?

4. How many fourths are there in $\frac{2}{4}$ plus $\frac{2}{4}$ plus $\frac{2}{4}$?

5. How many fifths are there in $\frac{2}{5}$ plus $\frac{2}{5}$? In $\frac{3}{5}$ plus $\frac{2}{5}$? In $\frac{3}{5}$ plus $\frac{3}{5}$?

6. What is the sum of $\frac{3}{7}$ and $\frac{4}{7}$? Of $\frac{5}{7}$ and $\frac{5}{7}$?

7. What is the sum of $\frac{7}{8}$ plus $\frac{5}{8}$? Of $\frac{6}{8}$ plus $\frac{3}{8}$?

8. What is the sum of $\frac{6}{9}$ plus $\frac{4}{9}$? Of $\frac{5}{9}$ plus $\frac{7}{9}$?

9. What is the sum of $\frac{1}{6}$, $\frac{3}{6}$ and $\frac{2}{6}$? Of $\frac{4}{6}$, $\frac{3}{6}$ and $\frac{2}{6}$?

10. What is the sum of $\frac{2}{7}$, $\frac{6}{7}$ and $\frac{1}{7}$? Of $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{7}{8}$?

11. What is the sum of $\frac{2}{9}$, $\frac{4}{9}$ and $\frac{7}{9}$? Of $\frac{5}{10}$, $\frac{6}{10}$ and $\frac{9}{10}$?

12. What is the sum of $\frac{4}{11}$, $\frac{7}{11}$ and $\frac{5}{11}$? Of $\frac{8}{11}$, $\frac{9}{11}$ and $\frac{7}{11}$?

13. What is the sum of $\frac{6}{12}$, $\frac{4}{12}$ and $\frac{5}{12}$? Of $\frac{8}{12}$, $\frac{9}{12}$ and $\frac{7}{12}$?

14. Mr. Smith paid $\frac{1}{4}$ of a dollar to James, $\frac{2}{4}$ to the milkman, $\frac{3}{4}$ to the butcher, and $\frac{6}{4}$ to the merchant. How much money did he pay out?

15. Frank gave $\frac{1}{5}$ of a pound of candy to Albert, $\frac{3}{5}$ to his mother, $\frac{2}{5}$ to his sister, and then had $\frac{2}{5}$ of a pound left. How many fifths had he at first?

16. How many sixths are there in $\frac{1}{2}$ and $\frac{2}{6}$?

17. How many ninths are there in $\frac{1}{3}$ and $\frac{4}{9}$?

18. How many eighths are there in $\frac{1}{4}$ and $\frac{7}{8}$?

19. How many fourths are there in $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{4}$?

20. How many eighths are there in $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$?

21. How many tenths are there in $\frac{1}{2}$, $\frac{1}{5}$ and $\frac{2}{10}$?

22. How many twelfths are there in $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{3}{4}$?

23. How many twentieths are there in $\frac{1}{4}$, $\frac{3}{5}$ and $\frac{7}{10}$?

24. What is the sum of $\frac{1}{2}$ and $\frac{2}{3}$?

SOLUTION.—$\frac{1}{2}$ equals $\frac{3}{6}$, and $\frac{2}{3}$ equal $\frac{4}{6}$; $\frac{3}{6}$ plus $\frac{4}{6}$ are $\frac{7}{6}$, or $1\frac{1}{6}$.

What is the sum of:

25. $\frac{1}{2}$ and $\frac{1}{3}$?
26. $\frac{1}{3}$ and $\frac{1}{4}$?
27. $\frac{1}{4}$ and $\frac{1}{5}$?
28. $\frac{1}{5}$ and $\frac{1}{6}$?
29. $\frac{1}{3}$ and $\frac{1}{8}$?
30. $\frac{1}{4}$ and $\frac{1}{6}$?
31. $\frac{1}{5}$ and $\frac{1}{8}$?
32. $\frac{1}{6}$ and $\frac{1}{7}$?
33. $\frac{1}{7}$ and $\frac{1}{8}$?
34. $\frac{1}{5}$ and $\frac{1}{9}$?
35. $\frac{1}{7}$ and $\frac{1}{9}$?
36. $\frac{1}{9}$ and $\frac{1}{10}$?
37. $\frac{1}{6}$ and $\frac{1}{12}$?
38. $\frac{1}{11}$ and $\frac{1}{12}$?
39. $\frac{1}{10}$ and $\frac{1}{15}$?
40. $\frac{2}{3}$ and $\frac{3}{4}$?
41. $\frac{3}{5}$ and $\frac{2}{3}$?
42. $\frac{3}{5}$ and $\frac{4}{7}$?
43. $\frac{6}{8}$ and $\frac{5}{9}$?
44. $\frac{6}{7}$ and $\frac{7}{11}$?
45. $\frac{11}{10}$ and $\frac{10}{11}$?
46. $\frac{3}{4}$ and $\frac{6}{8}$?
47. $\frac{7}{8}$ and $\frac{5}{6}$?
48. $\frac{7}{10}$ and $\frac{6}{15}$?
49. $\frac{4}{11}$ and $\frac{11}{4}$?
50. $\frac{7}{8}$ and $\frac{17}{18}$?
51. $\frac{9}{16}$ and $\frac{7}{10}$?
52. $\frac{7}{12}$ and $\frac{7}{8}$?
53. $\frac{8}{15}$ and $\frac{9}{25}$?
54. $\frac{8}{27}$ and $\frac{9}{15}$?
55. $\frac{1}{3}$, $\frac{2}{3}$ and $\frac{3}{4}$?
56. $\frac{2}{4}$, $\frac{4}{5}$ and $\frac{9}{10}$?
57. $\frac{5}{6}$, $\frac{7}{9}$ and $\frac{11}{12}$?
58. $\frac{6}{7}$, $\frac{7}{8}$ and $\frac{5}{56}$?
59. $\frac{5}{8}$, $\frac{7}{9}$ and $\frac{11}{12}$?
60. $\frac{3}{5}$, $\frac{5}{7}$ and $\frac{7}{9}$?

**61.** What is the sum of $2\frac{1}{2}$ and $2\frac{1}{3}$?

SOLUTION.—$\frac{1}{2}$ plus $\frac{1}{3}$ equal $\frac{5}{6}$; 2 plus 2 are 4. Therefore $2\frac{1}{2}$ plus $2\frac{1}{3}$ equal $4\frac{5}{6}$.

What is the sum of:

**62.** $3\frac{1}{2}$ and $4\frac{1}{4}$? **65.** $6\frac{2}{5}$ and $5\frac{1}{6}$? **68.** $1\frac{2}{5}$ and $3\frac{1}{4}$?

**63.** $5\frac{1}{3}$ and $6\frac{1}{4}$? **66.** $8\frac{1}{6}$ and $3\frac{3}{7}$? **69.** $5\frac{1}{5}$ and $6\frac{3}{10}$?

**64.** $7\frac{1}{4}$ and $6\frac{2}{5}$? **67.** $6\frac{2}{3}$ and $4\frac{5}{6}$? **70.** $6\frac{3}{5}$, $7\frac{1}{6}$ and $8\frac{1}{4}$?

**71.** Harry paid $\frac{1}{4}$ of a dollar for breakfast and $\frac{2}{5}$ of a dollar for a ticket. How much did he pay for both?

**72.** John rode $7\frac{1}{3}$ miles the first hour and $6\frac{3}{4}$ miles the second. How far did he ride in the two hours?

**73.** A lawyer spends $\frac{2}{3}$ of his time in his office and $\frac{1}{6}$ of his time in the court house. What part of his time does he spend in these two places?

**74.** A gentleman having $\frac{7}{8}$ of an acre of land, bought $\frac{7}{12}$ of an acre. How much land had he then?

**75.** Andrew can do $\frac{1}{7}$ of a piece of work in 1 day, and Albert can do $\frac{1}{8}$ of it in 1 day. What part can both do in 1 day?

**76.** If one pipe will fill a cistern in 6 hours, and a second pipe will fill it in 8 hours, what part of the cistern will both fill in 1 hour?

**77.** If I pay $\frac{5}{4}$ of a dollar for a turkey and $\frac{2}{5}$ of a dollar for a duck, what do I pay for both?

**78.** Mr. Bible paid $\$2\frac{1}{2}$ for a hat, $\$16\frac{3}{5}$ for a suit of clothes, and $\$3\frac{7}{8}$ for a pair of shoes. How many dollars did he pay for all?

**79.** An orchard contains $3\frac{1}{12}$ acres, and a meadow $4\frac{7}{8}$ acres. How many acres are there in both?

**80.** A farmer received $\$12\frac{3}{4}$ for hay, $\$3\frac{5}{8}$ for turkeys, and $\$116\frac{5}{8}$ for sheep. How much did he receive for all?

**81.** Three packages weigh respectively $5\frac{7}{16}$, $7\frac{5}{8}$, and $12\frac{4}{5}$ pounds. What is their total weight?

# SUBTRACTION

1. What is the difference between $\frac{3}{8}$ of an apple and $\frac{2}{8}$ of an apple?

2. What is the difference between $\frac{5}{4}$ of a dollar and $\frac{3}{4}$ of a dollar?

3. What is the difference between $\frac{7}{8}$ and $\frac{5}{8}$?

4. What is the difference between $\frac{7}{11}$ and $\frac{4}{11}$?

5. What is the difference between $\frac{9}{12}$ and $\frac{5}{12}$?

6. What is the difference between $\frac{15}{16}$ and $\frac{9}{16}$?

7. What is the difference between $\frac{14}{20}$ and $\frac{9}{20}$?

8. What is the difference between $\frac{3}{4}$ and $\frac{2}{5}$?

SOLUTION.—$\frac{3}{4}$ equal $\frac{15}{20}$, and $\frac{2}{5}$ equal $\frac{8}{20}$; $\frac{15}{20}$ minus $\frac{8}{20}$ are $\frac{7}{20}$.

What is the difference between:

9. $\frac{1}{2}$ and $\frac{1}{3}$?
10. $\frac{1}{4}$ and $\frac{1}{5}$?
11. $\frac{1}{3}$ and $\frac{1}{4}$?
12. $\frac{1}{5}$ and $\frac{1}{6}$?
13. $\frac{1}{4}$ and $\frac{1}{6}$?
14. $\frac{1}{3}$ and $\frac{1}{5}$?
15. $\frac{1}{5}$ and $\frac{1}{8}$?
16. $\frac{1}{7}$ and $\frac{1}{8}$?
17. $\frac{1}{6}$ and $\frac{1}{7}$?
18. $\frac{1}{10}$ and $\frac{1}{15}$?
19. $\frac{1}{6}$ and $\frac{1}{8}$?
20. $\frac{1}{9}$ and $\frac{1}{10}$?
21. $\frac{1}{7}$ and $\frac{1}{9}$?
22. $\frac{1}{6}$ and $\frac{1}{12}$?
23. $\frac{1}{4}$ and $\frac{4}{11}$?
24. $\frac{7}{8}$ and $\frac{1}{12}$?
25. $\frac{8}{15}$ and $\frac{7}{25}$?
26. $\frac{1}{11}$ and $\frac{1}{12}$?
27. $\frac{2}{3}$ and $\frac{3}{5}$?
28. $\frac{3}{5}$ and $\frac{4}{7}$?
29. $\frac{2}{3}$ and $\frac{3}{4}$?
30. $\frac{6}{8}$ and $\frac{5}{9}$?
31. $\frac{3}{4}$ and $\frac{4}{7}$?
32. $\frac{6}{7}$ and $\frac{7}{11}$?
33. $\frac{11}{10}$ and $\frac{10}{11}$?
34. $\frac{7}{8}$ and $\frac{5}{6}$?
35. $\frac{7}{10}$ and $\frac{3}{6}$?
36. $\frac{17}{18}$ and $\frac{7}{8}$?
37. $\frac{7}{10}$ and $\frac{9}{16}$?
38. $\frac{8}{15}$ and $\frac{8}{27}$?

39. If Frank had $\frac{1}{4}$ of a dollar and gave away $\frac{1}{5}$ of a dollar, how much money has he left?

40. A man sold $\frac{3}{4}$ of his wheat to one person and $\frac{1}{6}$ of it to another. What part of it did he keep?

41. If $\frac{1}{2}$ of a pole is in the air, $\frac{1}{7}$ in the water, and the rest in the mud, what part of the pole is in the mud?

42. James gave $\frac{1}{3}$ of a box of figs to his companions and $\frac{1}{4}$ of it to his sister. What part of the box of figs had he left?

43. A man owned $\frac{5}{6}$ of a boat, and sold $\frac{3}{5}$ of his share. What part of the boat did he then own?

44. Harry earned $\frac{8}{10}$ of a dollar, and Ruth earned $\frac{3}{4}$ of a dollar. How much more did Harry earn than Ruth?

45. What is the value of $7\frac{1}{8}$ minus $3\frac{3}{4}$?

SOLUTION.—$7\frac{1}{8}$ equal $6\frac{9}{8}$; $\frac{9}{8}$ minus $\frac{3}{4}$ equal $\frac{3}{20}$; 6 minus 3 are 3. Therefore $7\frac{1}{8}$ minus $3\frac{3}{4}$ equal $3\frac{3}{20}$.

What is the value of:

46. $3\frac{1}{2}$ minus $2\frac{2}{3}$?
47. $5\frac{1}{2}$ minus $2\frac{1}{4}$?
48. $7\frac{1}{2}$ minus $3\frac{2}{5}$?
49. $8\frac{2}{3}$ minus $5\frac{3}{4}$?
50. $4\frac{3}{4}$ minus $2\frac{4}{5}$?
51. $4\frac{3}{4}$ minus $\frac{3}{8}$?
52. $6\frac{1}{5}$ minus $3\frac{3}{10}$?
53. $9\frac{1}{4}$ minus $5\frac{1}{6}$?
54. $7\frac{2}{3}$ minus $5\frac{3}{8}$?
55. $6\frac{3}{5}$ minus $4\frac{2}{3}$?
56. $8\frac{1}{5}$ minus $3\frac{2}{7}$?
57. $4\frac{1}{4}$ minus $2\frac{1}{9}$?
58. $6\frac{3}{7}$ minus $4\frac{3}{4}$?
59. $5\frac{3}{5}$ minus $3\frac{5}{6}$?
60. $8\frac{3}{10}$ minus $5\frac{3}{15}$?
61. $4\frac{2}{5}$ minus $3\frac{3}{8}$?
62. $5\frac{3}{6}$ minus $4\frac{4}{7}$?
63. $9\frac{3}{5}$ minus $5\frac{7}{9}$?
64. $12\frac{4}{11}$ minus $8\frac{3}{4}$?
65. $10\frac{5}{6}$ minus $6\frac{7}{8}$?
66. $15\frac{6}{7}$ minus $4\frac{5}{11}$?
67. $6\frac{4}{7}$ minus $4\frac{5}{8}$?
68. $5\frac{3}{9}$ minus $3\frac{3}{10}$?
69. $16\frac{3}{7}$ minus $14\frac{2}{7}$?
70. $12\frac{1}{8}$ minus $8\frac{1}{7}$?
71. $18\frac{1}{12}$ minus $15\frac{3}{10}$?
72. $14\frac{7}{8}$ minus $8\frac{17}{18}$?
73. $12\frac{4}{5}$ minus $7\frac{7}{25}$?
74. $20\frac{4}{27}$ minus $8\frac{7}{15}$?
75. $\frac{1}{2}$ minus $\frac{1}{3}$ plus $\frac{3}{4}$?
76. $\frac{1}{4}$ plus $\frac{1}{10}$ minus $\frac{1}{5}$?
77. $\frac{3}{7}$ minus $\frac{1}{8}$ plus $\frac{5}{56}$?
78. $2\frac{1}{6}$ plus $2\frac{1}{3}$ minus $4\frac{1}{4}$?
79. $4\frac{1}{8}$ plus $5\frac{1}{16}$ minus $8\frac{1}{4}$?
80. $5\frac{3}{4}$ minus $3\frac{3}{8}$ plus $4\frac{3}{8}$?
81. $8\frac{1}{9}$ plus $3\frac{2}{12}$ minus $3\frac{6}{7}$?

82. A dealer sold $\frac{3}{8}$ of his grain to one man and $\frac{4}{9}$ of it to another. What part of all his grain did he sell? What part had he left?

83. The sum of two numbers is $12\frac{5}{9}$, and one of the numbers is $5\frac{7}{8}$. What is the other number?

84. From a piece of land containing $15\frac{3}{4}$ acres, $4\frac{4}{5}$ acres were sold. How many acres remained?

85. A is $25\frac{4}{5}$ years old, and B is $18\frac{7}{8}$ years old. What is the difference between their ages?

86. Flour was bought at $\$6\frac{3}{4}$ a barrel, and sold at $\$8\frac{1}{3}$. What was the gain per barrel?

87. Mr. Work gave $\frac{3}{8}$ of his farm to his son, $\frac{1}{4}$ to his daughter, and the remainder to his wife. What part of the farm did he give to his wife?

88. A woman having $4\frac{1}{2}$ gallons of molasses, used all but $2\frac{3}{8}$ gallons. How much molasses did she use?

89. If $4\frac{3}{7}$ be taken from a number the remainder is $3\frac{5}{8}$. What is the number?

90. The sum of three numbers is $15\frac{1}{12}$, and two of them are $8\frac{1}{6}$ and $4\frac{4}{15}$. What is the third number?

91. I bought a stove for $\$23\frac{3}{4}$, and a table for $\$21\frac{3}{5}$. I then sold both for \$50. What did I gain?

92. A gentleman having \$50 to divide among his 3 children, gave to the first $\$18\frac{3}{7}$, to the second $\$17\frac{1}{6}$, and to the third the remainder. How much money did the third receive?

## MULTIPLICATION

1. How much will 5 pounds of candy cost at $\frac{1}{4}$ of a dollar a pound?

SOLUTION.— Since 1 pound of candy costs $\frac{1}{4}$ of a dollar, 5 pounds will cost 5 times $\frac{1}{4}$ of a dollar, which are $\frac{5}{4}$ dollars, or $1\frac{1}{4}$ dollars.

2. If 1 pigeon is worth $\frac{1}{6}$ of a dollar, what are 4 pigeons worth?

3. A lamp burns $\frac{3}{7}$ of a quart of oil in 1 day. How much will it burn in 8 days?

4. If 1 can holds $\frac{3}{4}$ of a quart, how many quarts will 6 cans hold?

5. How many acres of potatoes will 5 boys hoe in a day, if they average $\frac{4}{5}$ of an acre each?

6. How many are 4 times $\frac{2}{3}$?

SOLUTION.—4 times $\frac{1}{3}$ are $\frac{4}{3}$, or $2\frac{1}{3}$.

How many are:

7. 3 times $\frac{3}{5}$?
8. 5 times $\frac{1}{4}$?
9. 4 times $\frac{5}{6}$?
10. 6 times $\frac{3}{7}$?
11. 7 times $\frac{3}{8}$?
12. 9 times $\frac{3}{10}$?
13. 8 times $\frac{4}{9}$?
14. 6 times $\frac{4}{11}$?
15. 12 times $\frac{5}{7}$?
16. 8 times $\frac{7}{10}$?
17. 12 times $\frac{8}{9}$?
18. 9 times $\frac{6}{11}$?

19. How many are 3 times $\frac{5}{6}$?

SOLUTION.—3 times $\frac{1}{6}$ equal $\frac{3}{6}$, or $1\frac{1}{2}$.

How many are:

20. 3 times $\frac{5}{6}$?
21. 4 times $\frac{3}{8}$?
22. 5 times $\frac{3}{10}$?
23. 6 times $\frac{7}{12}$?
24. 5 times $\frac{4}{15}$?
25. 7 times $\frac{3}{14}$?
26. 8 times $\frac{11}{16}$?
27. 10 times $\frac{13}{50}$?
28. 12 times $\frac{5}{72}$?
29. 9 times $\frac{13}{36}$?
30. 15 times $\frac{6}{45}$?
31. 12 times $\frac{17}{144}$?
32. 13 times $\frac{4}{39}$?
33. 25 times $\frac{8}{150}$?

34. How may a fraction be multiplied by a number which will divide its denominator?

35. How is a fraction multiplied by a number which will not divide its denominator?

36. What is the effect of multiplying the numerator, or of dividing the denominator of a fraction by a number?

37. How many are 7 times $3\frac{1}{3}$?

SOLUTION.—7 times $\frac{1}{3}$ are $\frac{7}{3}$, or $2\frac{1}{3}$; 7 times 3 are 21. Therefore 7 times $3\frac{1}{3}$ equal 21 plus $2\frac{1}{3}$, or $23\frac{1}{3}$.

How many are:

38. 3 times $3\frac{2}{3}$?
39. 5 times $4\frac{1}{2}$?
40. 4 times $5\frac{3}{4}$?
41. 3 times $5\frac{4}{5}$?

How many are:

42. 6 times $6\frac{1}{6}$?
43. 8 times $7\frac{3}{4}$?
44. 4 times $9\frac{5}{7}$?
45. 7 times $8\frac{4}{5}$?
46. 9 times $6\frac{3}{7}$?
47. 10 times $6\frac{11}{12}$?
48. 12 times $4\frac{3}{5}$?
49. 10 times $6\frac{7}{8}$?
50. 11 times $3\frac{7}{10}$?
51. 8 times $7\frac{6}{7}$?
52. 9 times $9\frac{9}{10}$?
53. 8 times $8\frac{7}{8}$?
54. 9 times $4\frac{5}{9}$?
55. 12 times $9\frac{3}{4}$?
56. 11 times $11\frac{11}{12}$?
57. 12 times $12\frac{11}{12}$?

58. If 1 book costs $\frac{4}{5}$ of a dollar, what will 6 books cost?

59. What is the cost of 9 bushels of wheat at $\frac{3}{4}$ of a dollar a bushel?

60. If a boy can ride his bicycle $8\frac{3}{5}$ miles in 1 hour, how far can he ride in 8 hours?

61. If 1 mason earns $\$2\frac{1}{2}$ a day, what will 12 masons earn in the same time?

62. If a furnace consumes $2\frac{7}{8}$ tons of coal in 1 month, how many tons will it consume in 5 months?

63. When sugar costs $8\frac{1}{2}$ cents a pound, what will 12 pounds cost?

64. How much candy will it require to give to each of 8 boys $\frac{3}{8}$ of a pound?

65. Two boys start from the same place and travel in opposite directions; one at the rate of $4\frac{2}{3}$ miles an hour, and the other at the rate of $3\frac{3}{4}$ miles an hour. How far apart are they in 7 hours?

66. Harry bought 8 bushels of wheat at $\frac{4}{5}$ of a dollar a bushel, and 7 bushels of corn at $\frac{2}{5}$ of a dollar a bushel. How much money did both cost?

67. Mrs. Smith sold a merchant 6 pounds of butter at $22\frac{1}{2}$ cents a pound. He gave her 10 pounds of sugar at $8\frac{1}{4}$ cents a pound and the balance in cash. How much cash did she receive?

68. What is the cost of $\frac{3}{5}$ of an acre of land at \$100 an acre?

SOLUTION.—If 1 acre of land costs \$100, $\frac{1}{5}$ of an acre will cost $\frac{1}{5}$ of \$100, or \$20, and $\frac{3}{5}$ of an acre will cost 3 times \$20, or \$60.

69. What is the cost of $\frac{5}{6}$ of a dozen bananas at 30 cents a dozen?

70. If John earns \$40 a month, what does he earn in $\frac{7}{8}$ of a month?

71. Andrew has 90 cents, and Albert has $\frac{1}{5}$ as many. How many cents has Albert?

72. How many oranges are $\frac{3}{4}$ of a dozen?

73. Five-sixths of 48 are how many times 4?

74. Seven-eighths of 72 are how many times $\frac{3}{4}$ of 28?

75. What is $\frac{1}{3}$ of 5?

SOLUTION.—Since $\frac{1}{3}$ of 1 is $\frac{1}{3}$, $\frac{1}{3}$ of 5 is 5 times $\frac{1}{3}$ which are $\frac{5}{3}$, or $1\frac{2}{3}$.

76. What is $\frac{1}{4}$ of 6? $\frac{1}{6}$ of 7? $\frac{1}{8}$ of 8?

77. What is $\frac{1}{2}$ of 9? $\frac{1}{7}$ of 12? $\frac{1}{4}$ of 7?

78. What is $\frac{1}{6}$ of 10? $\frac{1}{8}$ of 11? $\frac{1}{9}$ of 12?

79. What is $\frac{1}{10}$ of 11? $\frac{1}{11}$ of 12? $\frac{1}{5}$ of 10?

80. What are $\frac{3}{4}$ of 5?

SOLUTION.—Since $\frac{1}{4}$ of 5 is $\frac{5}{4}$, $\frac{3}{4}$ of 5 are 3 times $\frac{5}{4}$ which are $\frac{15}{4}$, or $3\frac{3}{4}$.

81. What are $\frac{2}{3}$ of 4? $\frac{3}{4}$ of 6? $\frac{5}{6}$ of 7?

82. What are $\frac{4}{5}$ of 7? $\frac{3}{8}$ of 9? $\frac{3}{7}$ of 11?

83. What are $\frac{3}{5}$ of 8? $\frac{5}{8}$ of 10? $\frac{2}{9}$ of 12?

84. What are $\frac{7}{8}$ of 11? $\frac{4}{5}$ of 15? $\frac{3}{11}$ of 20?

85. What are $\frac{7}{10}$ of 9? $\frac{5}{11}$ of 8? $\frac{7}{12}$ of 11?

86. What are $\frac{12}{7}$ of 4? $\frac{11}{10}$ of 12? $\frac{12}{11}$ of 10?

87. When butter is worth 25 cents a pound, what will $8\frac{1}{2}$ pounds cost?

88. If 1 yard of cloth costs 75 cents, what will $\frac{2}{3}$ of a yard cost?

89. When wheat is worth 95 cents a bushel, what is the cost of $10\frac{3}{4}$ bushels?

90. If 1 cord of wood is worth \$3, what are $4\frac{1}{4}$ cords worth?

91. How much must I pay for $6\frac{1}{2}$ barrels of apples at \$2 a barrel?

92. Grant has \$70, and $\frac{1}{2}$ of his money equals 5 times Maud's money. How much money has Maud?

93. A man sold $\frac{5}{8}$ of his farm containing 90 acres. How many acres did he keep?

94. When land is worth \$85 an acre, what will $4\frac{1}{2}$ acres cost?

95. When oranges are worth 30 cents a dozen, how much are they worth apiece?

96. How much will 4 dozen and 5 lemons cost at 20 cents a dozen?

97. How many more are $\frac{5}{6}$ of 78 marbles than $\frac{7}{8}$ of 72 marbles?

98. A saves $\$6\frac{1}{5}$ a month, and B saves $\$7\frac{3}{4}$ a month. What do they both save in a year?

99. What is $\frac{1}{2}$ of $\frac{1}{4}$?

SOLUTION.—Since $\frac{1}{4}$ equals $\frac{2}{8}$, $\frac{1}{2}$ of $\frac{1}{4}$ equals $\frac{1}{2}$ of $\frac{2}{8}$, or $\frac{1}{8}$. Therefore $\frac{1}{2}$ of $\frac{1}{4}$ is $\frac{1}{8}$.

100. What is $\frac{1}{2}$ of $\frac{1}{3}$? $\frac{1}{2}$ of $\frac{1}{5}$? $\frac{1}{2}$ of $\frac{1}{6}$?

101. What is $\frac{1}{3}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{4}$? $\frac{1}{3}$ of $\frac{1}{6}$?

102. What is $\frac{1}{4}$ of $\frac{1}{6}$? $\frac{1}{4}$ of $\frac{1}{2}$? $\frac{1}{5}$ of $\frac{1}{6}$?

103. What is $\frac{1}{5}$ of $\frac{1}{4}$? $\frac{1}{3}$ of $\frac{1}{5}$? $\frac{1}{5}$ of $\frac{1}{3}$?

104. What is $\frac{1}{2}$ of $\frac{1}{7}$? $\frac{1}{3}$ of $\frac{1}{6}$? $\frac{1}{6}$ of $\frac{1}{7}$?

105. What is $\frac{1}{3}$ of $\frac{1}{7}$? $\frac{1}{4}$ of $\frac{1}{8}$? $\frac{1}{7}$ of $\frac{1}{9}$?

106. What is $\frac{1}{6}$ of $\frac{1}{8}$? $\frac{1}{8}$ of $\frac{1}{9}$? $\frac{1}{7}$ of $\frac{1}{10}$?

107. What is $\frac{1}{8}$ of $\frac{1}{12}$? $\frac{1}{6}$ of $\frac{1}{7}$? $\frac{1}{7}$ of $\frac{1}{8}$?

108. What is $\frac{1}{5}$ of $\frac{1}{8}$? $\frac{1}{6}$ of $\frac{1}{4}$? $\frac{1}{7}$ of $\frac{1}{7}$?

109. What is $\frac{1}{5}$ of $\frac{1}{5}$? $\frac{1}{10}$ of $\frac{1}{11}$? $\frac{1}{11}$ of $\frac{1}{12}$?

110. What are $\frac{2}{3}$ of $\frac{5}{8}$?

SOLUTION.—$\frac{1}{3}$ of $\frac{5}{8}$ is $\frac{5}{24}$, and $\frac{2}{3}$ of $\frac{5}{8}$ are 2 times $\frac{5}{24}$, which are $\frac{10}{24}$, or $\frac{5}{12}$.

111. What are $\frac{2}{3}$ of $\frac{4}{5}$? $\frac{3}{4}$ of $\frac{5}{6}$? $\frac{4}{5}$ of $\frac{6}{7}$?

112. What are $\frac{3}{4}$ of $\frac{12}{13}$? $\frac{2}{5}$ of $\frac{3}{8}$? $\frac{3}{4}$ of $\frac{2}{5}$?

113. What are $\frac{5}{6}$ of $\frac{7}{10}$? $\frac{3}{8}$ of $\frac{5}{4}$? $\frac{3}{5}$ of $\frac{7}{9}$?

114. What are $\frac{4}{7}$ of $\frac{5}{9}$? $\frac{3}{4}$ of $\frac{7}{8}$? $\frac{5}{6}$ of $\frac{12}{15}$?

115. What are $\frac{4}{7}$ of $\frac{5}{9}$? $\frac{9}{10}$ of $\frac{7}{11}$? $\frac{6}{7}$ of $\frac{8}{9}$?

116. What are $\frac{5}{11}$ of $\frac{2}{3}$? $\frac{3}{4}$ of $\frac{12}{17}$? $\frac{9}{10}$ of $\frac{11}{12}$?

117. What are $\frac{2}{3}$ of $\frac{6}{5}$? $\frac{4}{5}$ of $\frac{10}{7}$? $\frac{3}{4}$ of $\frac{16}{5}$?

118. What are $\frac{5}{8}$ of $\frac{24}{7}$? $\frac{5}{6}$ of $4\frac{2}{7}$? $\frac{6}{7}$ of $6\frac{1}{6}$?

119. What are $\frac{5}{7}$ of $7\frac{1}{2}$? $\frac{5}{8}$ of $9\frac{3}{5}$? $\frac{6}{5}$ of $\frac{9}{7}$?

What is the value of:

120. $2\frac{1}{4}$ times $3\frac{2}{3}$?

121. $4\frac{1}{3}$ times $5\frac{1}{4}$?

122. $7\frac{3}{4}$ times $2\frac{2}{5}$?

123. $3\frac{1}{8}$ times $6\frac{1}{4}$?

124. $4\frac{1}{4}$ times $4\frac{4}{5}$?

125. $2\frac{2}{3}$ times $3\frac{3}{5}$?

126. $5\frac{1}{8}$ times $1\frac{5}{7}$?

127. $10\frac{3}{4}$ times $3\frac{1}{6}$?

128. $6\frac{1}{6}$ times $2\frac{2}{5}$?

129. $8\frac{4}{7}$ times $5\frac{1}{12}$?

130. $\frac{5}{6}$ of $\frac{3}{5}$ of 60?

131. $\frac{3}{4}$ of $\frac{8}{9}$ of $12\frac{2}{5}$?

132. $\frac{4}{5}$ of $\frac{1}{2}$ of $7\frac{7}{8}$?

133. $\frac{3}{5}$ of 49 times $\frac{1}{3}$?

134. A boy having $\frac{1}{4}$ of a watermelon, ate $\frac{1}{2}$ of it. What part of the melon did he eat?

135. Henry had $\frac{3}{4}$ of a dollar and gave $\frac{2}{5}$ of it away. How much did he keep?

136. How much money can a man earn in $\frac{3}{4}$ of a day at $\$1\frac{1}{2}$ a day.

137. If wood costs $\$3\frac{1}{4}$ a cord, how much will $2\frac{2}{3}$ cords cost?

138. How many miles will a ship sail in $\frac{7}{8}$ of an hour, if it sails $5\frac{6}{7}$ miles an hour?

139. A lady had $\$16\frac{1}{2}$, and paid $\frac{5}{6}$ of it for a coat; what was the cost of the coat?

140. If a farmer sells $\frac{3}{4}$ of $23\frac{3}{7}$ bushels of potatoes

at 60 cents a bushel, how much should he receive for them?

141. Luther gathered $\frac{7}{8}$ of a bushel of walnuts, and sold $\frac{1}{3}$ of them. How much money did he receive for what he sold, if walnuts were worth $\$1\frac{1}{4}$ per bushel?

142. If a horse eats $12\frac{1}{2}$ bushels of oats in 1 month, how many bushels will he eat in $4\frac{3}{4}$ months?

143. What will $5\frac{1}{2}$ tons of coal cost at $\$3\frac{3}{4}$ a ton?

144. If a pound of soap cost $8\frac{1}{2}$ cents, what will $7\frac{3}{4}$ pounds cost.

145. At $9\frac{1}{2}$ cents a dozen, what will $6\frac{1}{4}$ dozen pears cost?

146. A boy earns $10\frac{1}{2}$ cents an hour. How much will he earn in $\frac{5}{9}$ of 15 hours?

147. If a man's wages per week are $1\frac{3}{5}$ times $\$12\frac{1}{2}$, what does he earn per week?

## DIVISION

1. If 4 boys earn $\frac{9}{10}$ of a dollar, how much does 1 boy earn?

SOLUTION.—If 4 boys earn $\frac{9}{10}$ of a dollar, 1 boy will earn $\frac{1}{4}$ of $\frac{9}{10}$ of a dollar, or $\frac{9}{40}$ of a dollar.

2. If 5 tablets cost $\frac{3}{5}$ of a dollar, what will 1 tablet cost?

3. If 6 men can do $\frac{8}{9}$ of a piece of work in a day, what fraction of the work can 1 man do in a day?

4. When 3 pounds of butter are worth $\frac{7}{8}$ of a dollar, what is 1 pound of butter worth?

5. A boy, having $\frac{11}{12}$ of a pound of candy, shared it with 4 of his companions. What part of a pound did he give to each companion?

6. Fourteen fifteenths of an acre are divided into 8 equal lots. What fraction of an acre is there in each lot?

7. How many times are 3 contained in $\frac{5}{8}$?

SOLUTION.—1 is contained in $\frac{5}{8}$, $\frac{5}{8}$ times, and 3 are contained in $\frac{5}{8}$, $\frac{1}{3}$ of $\frac{5}{8}$ times, or $\frac{5}{15}$ times.

8. How many times are 4 contained in $\frac{3}{4}$? In $\frac{8}{9}$? In $\frac{5}{6}$?

9. How many times are 2 contained in $\frac{1}{2}$? In $\frac{3}{4}$? In $\frac{3}{5}$?

10. How many times are 3 contained in $\frac{4}{5}$? In $\frac{6}{7}$? In $\frac{9}{100}$?

11. How many times are 5 contained in $\frac{3}{8}$? In $\frac{5}{6}$? In $\frac{7}{8}$?

12. How many times are 7 contained in $\frac{5}{6}$? In $\frac{7}{8}$? In $\frac{8}{9}$?

13. Divide $1\frac{3}{4}$ by 6.

SOLUTION.—$1\frac{3}{4}$ equal $\frac{7}{4}$; $\frac{7}{4}$ divided by 1 are $\frac{7}{4}$, and $\frac{7}{4}$ divided by 6 are $\frac{1}{6}$ of $\frac{7}{4}$, or $\frac{7}{24}$.

14. Divide $\frac{4}{5}$ by 6. By 7. By 8.

15. Divide $\frac{7}{6}$ by 8. By 6. By 9.

16. Divide $1\frac{1}{2}$ by 9. By 8. By 6.

17. How many times are 8 contained in $\frac{11}{12}$? In $\frac{10}{11}$? In $\frac{9}{10}$?

18. Divide $4\frac{2}{3}$ by 6. By 10. By 11.

19. Divide $5\frac{3}{4}$ by 12. By 9. By 7.

20. How many times are 6 contained in $\frac{5}{8}$? In $\frac{7}{11}$? In $\frac{5}{9}$?

21. How many times are 9 contained in $\frac{11}{12}$? In $\frac{3}{4}$? In $\frac{7}{8}$?

22. If a bushel of chestnuts costs \$3, what part of a bushel can be bought for $\frac{1}{2}$ of a dollar?

23. How long will it take a boy to ride $\frac{11}{12}$ of a mile at the rate of $\frac{7}{12}$ of a mile an hour?

24. George gave $1\frac{1}{4}$ dollars for apricots at the rate of \$3 a bushel. What fraction of a bushel did he buy?

**25.** At $\frac{2}{5}$ of a dollar a bushel, how many bushels of oats can be bought for \$10?

SOLUTION.—Since 1 bushel of oats is worth $\frac{2}{5}$ of a dollar, for \$10, or $\$\frac{10}{1}$, as many bushels can be bought as $\frac{2}{5}$ are contained times in $\frac{10}{1}$, or 25 bushels.

**26.** If Frank earns $\frac{3}{4}$ of a dollar a day, how long will it take him to earn \$12?

**27.** Harry can hoe $\frac{3}{4}$ of an acre of corn in 1 day. How long will it take him to hoe 5 acres?

**28.** How many ducks at $\frac{5}{8}$ of a dollar each can be bought for \$5?

**29.** How many bushels of clover seed can be bought for \$11, if 2 bushels are worth \$5?

**30.** If $2\frac{3}{4}$ pounds of rice cost 22 cents, what will 1 pound cost?

**31.** How many times are $\frac{3}{4}$ contained in 3?

SOLUTION (1).—3 are equal to $\frac{12}{4}$; $\frac{3}{4}$ are contained as many times in $\frac{12}{4}$ as 3 are contained in 12, or 4 times.

SOLUTION (2).—1 is contained in 3, 3 times, and $\frac{1}{4}$ is contained in 3, 4 times 3 times, or 12 times, and $\frac{3}{4}$ are contained in 3, $\frac{1}{4}$ of 12 times, or 4 times.

**32.** How many times are $\frac{2}{3}$ contained in 3? In 5?

**33.** How many times are $\frac{3}{5}$ contained in 4? In 7?

**34.** How many times are $\frac{5}{6}$ contained in 8? In 11?

**35.** How many times are $\frac{3}{5}$ contained in 4? In 10?

**36.** Divide 4 by $\frac{2}{7}$. 3 by $\frac{5}{8}$. 4 by $\frac{7}{8}$. 7 by $\frac{11}{12}$.

**37.** Divide 5 by $\frac{3}{4}$. 6 by $\frac{3}{7}$. 7 by $\frac{8}{9}$. 12 by $\frac{10}{11}$.

**38.** How many times are $\frac{6}{7}$ contained in 5? In 9?

**39.** How many times are $\frac{8}{9}$ contained in 2? In 7?

**40.** How many times are $\frac{11}{12}$ contained in 3? In 10?

**41.** Divide 11 by $1\frac{1}{2}$. 10 by $2\frac{3}{5}$. 8 by $4\frac{3}{5}$. 6 by $5\frac{2}{7}$.

**42.** How many times are $\frac{2}{5}$ contained in $\frac{4}{5}$? In $\frac{6}{5}$?

**43.** How many times are $\frac{5}{8}$ contained in $\frac{5}{8}$? In $\frac{7}{8}$?

44. How many times is $\frac{1}{3}$ contained in $\frac{5}{6}$? In $\frac{7}{9}$?
45. How many times are $\frac{2}{3}$ contained in $\frac{3}{4}$? In $\frac{4}{5}$?
46. How many times are $\frac{3}{4}$ contained in $\frac{4}{5}$? In $\frac{5}{6}$?
47. How many times are $\frac{2}{5}$ contained in $\frac{3}{4}$? In $\frac{5}{8}$?
48. How many times are $\frac{6}{7}$ contained in $\frac{4}{5}$? In $\frac{5}{6}$?
49. How many times is $\frac{1}{6}$ contained in $\frac{5}{9}$? In $\frac{3}{10}$?
50. How many times are $\frac{5}{8}$ contained in $\frac{3}{4}$? In $\frac{11}{12}$?
51. How many times are $\frac{5}{9}$ contained in $\frac{5}{4}$? In $1\frac{1}{6}$?
52. Divide $\frac{3}{4}$ by $\frac{1}{6}$. $\frac{3}{8}$ by $\frac{1}{2}$. $\frac{3}{5}$ by $\frac{5}{6}$. $\frac{5}{6}$ by $\frac{3}{4}$.
53. Divide $2\frac{1}{4}$ by $1\frac{1}{2}$. $4\frac{1}{3}$ by $3\frac{3}{4}$. $4\frac{3}{7}$ by $6\frac{1}{2}$. $9\frac{1}{2}$ by $3\frac{3}{4}$.
54. How many bushels of apples at $\frac{3}{5}$ of a dollar a bushel can be bought for $\$3\frac{3}{5}$?
55. How many times will $6\frac{3}{4}$ gallons of oil fill a can that holds $\frac{3}{4}$ of a gallon?
56. If a yard of calico is worth $\frac{3}{5}$ of a dime, how many yards can you purchase for $\frac{9}{10}$ of a dime?
57. At $\$5\frac{1}{2}$ apiece, how many calves can be bought for $\$27\frac{1}{2}$?
58. If 2 baskets of pears are worth \$3, how many baskets can be bought for $\$10\frac{1}{2}$?
59. If a man can walk $3\frac{1}{2}$ miles in an hour, how many hours will it take him to walk $8\frac{1}{3}$ miles?

What is the value of:

60. $\frac{11}{7}$ divided by 9?
61. $\frac{14}{15}$ divided by 8?
62. 15 divided by $\frac{5}{7}$?
63. 18 divided by $\frac{3}{2}$?
64. $\frac{4}{7}$ divided by $\frac{3}{4}$?
65. $\frac{4}{3}$ divided by $\frac{12}{20}$?
66. $\frac{11}{20}$ divided by $\frac{4}{7}$?
67. $\frac{7}{10}$ divided by 8?
68. 6 divided by $\frac{5}{8}$?
69. $\frac{6}{10}$ divided by $\frac{11}{12}$?
70. $\frac{15}{20}$ divided by 7?
71. $1\frac{11}{12}$ divided by 9?
72. $\frac{6}{7}$ divided by $\frac{5}{8}$?
73. $9\frac{7}{9}$ divided by 12?
74. $4\frac{3}{4}$ divided by $3\frac{1}{2}$?
75. $4\frac{3}{7}$ divided by 8?
76. $\frac{9}{17}$ divided by 11?
77. $6\frac{5}{9}$ divided by $\frac{5}{3}$?
78. $16\frac{2}{3}$ divided by 6?
79. 9 divided by $\frac{7}{8}$?

What is the value of:

80. $8\frac{4}{5}$ divided by 4?
81. $6\frac{1}{2}$ divided by $2\frac{1}{6}$?
82. 24 divided by $7\frac{3}{5}$?
83. $\frac{1}{3}$ divided by $\frac{6}{7}$?
84. $\frac{1}{12}$ divided by $3\frac{3}{4}$?
85. $\frac{5}{9}$ divided by $\frac{3}{4}$ of $\frac{4}{5}$?
86. $3\frac{2}{3}$ divided by $\frac{7}{8}$ of $\frac{6}{7}$?
87. $\frac{6}{7}$ of $1\frac{1}{2}$ divided by $\frac{3}{4}$?
88. $\frac{1}{2}$ of $3\frac{2}{3}$ divided by $\frac{5}{6}$?
89. $\frac{2}{3}$ of $\frac{4}{5}$ divided by $\frac{5}{6}$?

90. At $\$1\frac{3}{4}$ a yard, how many yards of cloth can be bought for \$7?

91. If 8 pounds of coffee cost $\$1\frac{4}{5}$, how much does 1 pound cost?

92. A cow was sold for \$54, which was $1\frac{1}{2}$ times what she cost. How much did the cow cost?

93. How many bushels of tomatoes at $\frac{3}{4}$ of a dollar a bushel can be bought for $\$8\frac{1}{4}$?

94. How many sheep at $\$3\frac{1}{2}$ each can be bought for \$28?

95. For how many days' board will \$25 pay, at $\$2\frac{1}{2}$ a day?

96. If $3\frac{3}{4}$ pounds of meat cost $43\frac{1}{8}$ cents, what is the cost per pound?

97. How many men will it require to do a piece of work in $2\frac{7}{8}$ days, if 1 man can do it in $11\frac{1}{2}$ days?

98. If a horse eats $\frac{3}{8}$ of a bushel of oats in 1 day, how long will it take him to eat $4\frac{1}{2}$ bushels?

99. If a man travels $58\frac{1}{2}$ miles in $9\frac{3}{4}$ hours, how far does he travel in 1 hour?

100. If 1 turkey can be bought for $\$1\frac{3}{4}$, how many turkeys at the same rate can be bought for $\$12\frac{1}{4}$?

101. Harry rides $35\frac{1}{3}$ miles on a bicycle in $4\frac{5}{12}$ hours. How many miles does he ride in an hour?

102. Mrs. Blaine exchanged $3\frac{1}{4}$ pounds of butter worth $\frac{1}{4}$ of a dollar a pound for sugar worth 6 cents a pound. How many pounds of sugar did she receive?

## RELATION OF NUMBERS

1. What fraction of 5 are 2?

SOLUTION.—1 is $\frac{1}{5}$ of 5, and 2 are 2 times $\frac{1}{5}$ of 5, or $\frac{2}{5}$ of 5. Therefore 2 are $\frac{2}{5}$ of 5.

What fraction of:

2. 4 are 3?
3. 5 are 3?
4. 6 are 4?
5. 10 are 7?
6. 8 are 5?
7. 9 are 4?
8. 10 are 6?
9. 7 are 3?
10. 7 are 8?
11. 4 are 9?
12. 15 are 11?
13. 25 are 15?
14. 18 are 12?
15. 24 are 16?
16. 16 are 4?
17. 36 are 6?
18. 20 are 7?
19. 50 are 25?

20. What fraction of 1 foot are 8 inches? 9 inches?

21. What fraction of 1 week are 4 days? 6 days?

22. What fraction of \$1 are 25 cents? 50 cents? 75 cents?

23. What part of 1 bushel is 1 peck? 1 quart?

24. If 9 apples cost 15 cents, what will 3 apples cost?

SOLUTION.—If 9 apples cost 15 cents, 3 apples, which are $\frac{3}{9}$ or $\frac{1}{3}$ of 9 apples, will cost $\frac{1}{3}$ of 15 cents, or 5 cents.

25. If 4 barrels of flour cost \$12$\frac{1}{2}$, what will 8 barrels cost?

26. If 12 turkeys are worth \$18, what are 9 turkeys worth?

27. If 18 cents buy 1 dozen eggs, how many eggs will 54 cents buy?

28. If 4 cows are worth \$130, what are 24 cows worth?

29. At \$16 a ton, what fraction of a ton of hay can be bought for \$5?

30. If a horse costing \$75 was sold for \$100, what fraction of the selling price was the cost?

31. Frank has \$15 and Albert has \$12. What fraction of Frank's money equals Albert's money?

32. If 8 men can do a piece of work in $11\frac{1}{4}$ days, how long will it take 12 men to do it?

33. If a train runs 726 miles in 36 hours, how far will it run in 3 hours?

34. Mr. Smith walked 15 miles in 6 hours. How far would he walk in 8 hours at the same rate?

35. What fraction of 4 are $\frac{3}{5}$?

SOLUTION (1).—1 is $\frac{1}{4}$ of 4, and $\frac{1}{5}$ is $\frac{1}{5}$ of $\frac{1}{4}$ or $\frac{1}{20}$ of 4, and $\frac{3}{5}$ are 3 times $\frac{1}{20}$ or $\frac{3}{20}$ of 4. Therefore $\frac{3}{5}$ are $\frac{3}{20}$ of 4.

SOLUTION (2).—Since 4 equal $\frac{20}{5}$, $\frac{3}{5}$ are the same fraction of $\frac{20}{5}$ that 3 are of 20, or $\frac{3}{20}$.

What fraction of:

36. 2 are $\frac{2}{3}$?
37. 3 are $\frac{3}{5}$?
38. 2 are $\frac{3}{4}$?
39. 4 are $\frac{5}{6}$?
40. 6 are $\frac{4}{5}$?
41. 8 are $\frac{3}{7}$?
42. 5 are $\frac{3}{4}$?
43. 7 is $\frac{1}{2}$?
44. 9 are $\frac{5}{6}$?
45. 8 are $\frac{7}{9}$?
46. 10 are $\frac{12}{11}$?
47. 12 are $\frac{4}{3}$?
48. 6 are $\frac{5}{8}$?
49. 11 are $2\frac{3}{4}$?
50. 9 are $5\frac{3}{5}$?
51. 4 are $\frac{3}{5}$ of $1\frac{5}{8}$?
52. 7 are $\frac{7}{9}$ of $4\frac{2}{3}$?
53. $\frac{3}{4}$ of 12 are $\frac{2}{3}$ of 7?
54. $\frac{2}{3}$ of 9 are $\frac{3}{4}$ of 5?
55. $\frac{7}{8}$ of 24 are $\frac{7}{9}$ of 8?
56. $1\frac{1}{2}$ of 36 are $\frac{7}{3}$ of 4?

57. What fraction of \$1 are $16\frac{2}{3}$ cents? $18\frac{3}{4}$ cents? $33\frac{1}{3}$ cents?

58. What fraction of \$1 are $37\frac{1}{2}$ cents? $62\frac{1}{2}$ cents? $87\frac{1}{2}$ cents?

59. What fraction of \$10 are \$.50? \$3.75? \$8.75?

60. What fraction of \$100 are $\$8\frac{1}{3}$? $\$12\frac{1}{2}$? $\$66\frac{2}{3}$?

61. A coat cost \$8 and a hat $\$2\frac{1}{2}$. What fraction of the cost of the coat equals the cost of the hat?

62. Lewis has \$8 and Henry has $\$3\frac{3}{4}$. What fraction of Lewis' money equals Henry's?

63. If 12 bushels of wheat cost \$11.40, what will $2\frac{2}{3}$ bushels cost?

64. What will $13\frac{1}{3}$ yards of cloth cost, if 40 yards cost \$33?

65. If 32 pounds of rice cost \$2.40, what will $10\frac{2}{3}$ pounds cost?

66. A coat was bought for \$5 and sold for \$6.50. What fraction of the cost was gained?

67. Frank rode 40 miles in 6 hours. What fraction of the distance did he ride in $3\frac{1}{2}$ hours?

68. Henry can pick 25 bushels of apples in 8 hours. How many bushels can he pick in $2\frac{2}{3}$ hours?

69. What will $2\frac{1}{4}$ quarts of berries cost, if 9 quarts cost 50 cents?

70. A has \$36 and B has $\frac{5}{6}$ of \$12. What fraction of A's money is B's?

71. What fraction of $\frac{3}{4}$ are $\frac{2}{3}$?

SOLUTION (1).—$\frac{1}{4}$ is $\frac{1}{3}$ of $\frac{3}{4}$, and $\frac{1}{4}$ are 4 times $\frac{1}{3}$ or $\frac{4}{3}$ of $\frac{3}{4}$; $\frac{1}{3}$ is $\frac{1}{3}$ of $\frac{4}{3}$, or $\frac{4}{9}$ of $\frac{3}{4}$, and $\frac{2}{3}$ are 2 times $\frac{4}{9}$, or $\frac{8}{9}$ of $\frac{3}{4}$. Therefore $\frac{2}{3}$ are $\frac{8}{9}$ of $\frac{3}{4}$.

SOLUTION (2).—Since $\frac{3}{4}$ equal $\frac{9}{12}$ and $\frac{2}{3}$ equal $\frac{8}{12}$, $\frac{8}{12}$ are the same fraction of $\frac{9}{12}$ that 8 are of 9, or $\frac{8}{9}$.

What fraction of:

| | | |
|---|---|---|
| 72. $\frac{3}{4}$ are $\frac{3}{5}$? | 78. $\frac{8}{9}$ are $\frac{7}{8}$? | 84. $\frac{10}{11}$ are $\frac{4}{9}$? |
| 73. $\frac{2}{3}$ is $\frac{1}{2}$? | 79. $\frac{7}{8}$ are $\frac{6}{7}$? | 85. $\frac{7}{10}$ are $\frac{4}{7}$? |
| 74. $\frac{4}{5}$ are $\frac{3}{4}$? | 80. $\frac{9}{10}$ are $\frac{4}{5}$? | 86. $\frac{9}{11}$ are $\frac{7}{8}$? |
| 75. $\frac{6}{7}$ are $\frac{5}{6}$? | 81. $\frac{7}{9}$ are $\frac{2}{3}$? | 87. $\frac{5}{12}$ are $\frac{3}{5}$? |
| 76. $\frac{5}{6}$ are $\frac{4}{5}$? | 82. $\frac{3}{5}$ are $\frac{2}{7}$? | 88. $\frac{8}{9}$ are $\frac{7}{8}$? |
| 77. $\frac{7}{8}$ are $\frac{7}{9}$? | 83. $\frac{5}{11}$ are $\frac{4}{10}$? | 89. $2\frac{1}{2}$ are $1\frac{1}{3}$? |

90. Mr. Smith owned $\frac{3}{5}$ of a farm and sold $\frac{1}{3}$ of the whole farm. What fraction of his property did he sell?

91. I bought a dog for $\$4\frac{1}{2}$ and sold him for $\$6\frac{1}{2}$. What fraction of the cost equals the gain?

92. If oranges are bought at the rate of 3 for 5 cents, and sold at the rate of 2 for 5 cents, what fraction of the cost equals the gain?

93. Harry and John each have \$1. Harry spent $\frac{1}{6}$ of

his and John spent $\frac{3}{5}$ of his. What fraction of Harry's money then equalled John's?

94. What fraction of $\frac{5}{6}$ of $\frac{6}{5}$ are $\frac{3}{4}$ of $\frac{2}{6}$? $3\frac{1}{2}$ of $\frac{1}{3}$ are $\frac{4}{5}$ of $\frac{1}{4}$?

95. What fraction of $\frac{7}{8}$ of $\frac{12}{4}$ are $\frac{4}{5}$ of $\frac{11}{3}$? $\frac{7}{4}$ of $\frac{8}{2}$ are $\frac{6}{7}$ of $\frac{7}{8}$?

96. If Adam rides his wheel $14\frac{2}{7}$ miles in $2\frac{1}{4}$ hours, how far at this rate will he ride in $6\frac{3}{4}$ hours?

97. John earns $\$1\frac{2}{5}$ a day, and his father earns $\$2\frac{1}{4}$. What fraction of his father's wages equals John's wages?

98. Harry has \$90, and Andrew has $\frac{4}{15}$ as many plus \$36. What fraction of Harry's money equals Andrew's money?

99. A huckster bought $\frac{11}{12}$ of a flock of turkeys and sold $\frac{3}{8}$ of them. What fraction of his turkeys did he sell?

100. If an article was bought for $\$8\frac{1}{4}$, and sold for $\$9\frac{2}{7}$, what fraction of the cost equals the gain?

## ARITHMETICAL ANALYSIS

1. If 6 turkeys cost \$10, how many dollars will 11 turkeys cost?

SOLUTION.—If 6 turkeys cost \$10, 1 turkey costs $\frac{1}{6}$ of \$10, or $\$\frac{10}{6}$, and 11 turkeys will cost 11 times $\$\frac{10}{6}$, which are $\$\frac{110}{6}$, or $\$18\frac{1}{3}$. Therefore, if 6 turkeys cost \$10, 11 turkeys will cost $\$18\frac{1}{3}$.

2. If 9 boxes hold 102 cubes, how many cubes will 12 boxes hold?

3. Since 12 tablets cost 66 cents, what will 70 tablets cost?

4. If I pay \$30 board for 8 weeks, what must I pay for 11 weeks' board at the same rate?

5. If 4 horses are worth \$450, what are 6 horses worth?

6. What should I pay for 7 chickens, if 1 pay $\$1\frac{1}{5}$ for 3 chickens?

7. If 11 men can dig a ditch in 72 hours, in how many hours will 5 of them dig it?

8. Fred earned $\$27\frac{1}{2}$ in 5 days. How much money would he earn in 16 days at the same rate?

9. If 3 bags of seed weigh $255\frac{1}{2}$ pounds, what will 7 such bags weigh?

10. If 6 tons of coal cost $\$25\frac{1}{2}$, what will 13 tons cost?

11. What must I pay for 7 gallons of kerosene, if 5 gallons cost $37\frac{1}{2}$ cents?

12. Since 9 pails hold 21 gallons, what will 15 such pails hold?

13. If 12 boys hoe a field of corn in $25\frac{1}{2}$ days, how long will it take 5 boys to do the same work?

14. If there are 280 sheets in 12 tablets, how many sheets are there in 9 such tablets?

15. How much must I pay for 6 geese, if 4 geese cost $3.78?

16. If pears are retailed at 25 cents a dozen, what will 60 pears cost?

17. Henry worked 5 weeks for $91. What would he have received had he worked 12 weeks at the same rate?

18. If it requires 3 pecks of corn to feed 45 chickens, how many pecks will it require to feed 150 chickens?

19. Arthur traded 25 tops for 10 knives worth 15 cents apiece. What were 9 tops worth?

20. If it requires 7 men 18 days to do a piece of work, how many days will it require 5 men to do the same piece of work?

21. If a cyclist travels 125 miles in 9 hours, how far will he travel in 10 hours?

22. A train goes 120 miles in 6 hours. How many hours will be required for it to go 156 miles?

23. What must I pay for 30 pounds of flour, if 7 pounds cost $26\frac{1}{4}$ cents?

24. If 6 men can build a wall in 25 days, in how many days can 8 men build it?

25. Three fourths of an acre produce 18 bushels of wheat. What will an acre produce?

SOLUTION.—Since $\frac{3}{4}$ of an acre produce 18 bushels, $\frac{1}{4}$ produces $\frac{1}{3}$ of 18 bushels, or 6 bushels, and $\frac{4}{4}$, or 1 acre, will produce 4 times 6 bushels, or 24 bushels. Therefore, etc.

26. If $\frac{7}{8}$ of a load of flour cost \$56, what will 1 load cost?

27. John paid \$45 for $\frac{3}{5}$ of an acre of ground. At that rate what will an acre cost?

28. How many boxes will hold 96 bushels of apples, if $\frac{7}{8}$ of a box hold 14 bushels?

29. If $\frac{15}{16}$ of a barrel of sugar cost $\$7\frac{1}{2}$, what will 25 barrels cost?

30. If \$68 equal $\frac{17}{18}$ of the selling price of a horse, what will be the selling price of 5 such horses?

31. If $6\frac{1}{4}$ bushels of wheat cost \$5, what will 9 bushels cost?

32. What will 20 pounds of coffee cost, if $\frac{3}{4}$ of a pound cost 27 cents?

33. What will 9 pounds of butter cost, if $7\frac{1}{2}$ pounds cost \$1.80?

34. Find the value of a farm of 80 acres, if $3\frac{3}{4}$ acres are worth \$225.

35. If a crate $\frac{3}{4}$ full contains 6 dozen eggs, how many crates will hold 96 dozen?

36. If $\frac{3}{5}$ of a box of lemons are worth 15 dozen oranges at 20 cents a dozen, what are 6 such boxes of lemons worth?

37. Mr. Fetter's age, which is 45 years, is $\frac{5}{9}$ of Mr. Markel's age. How old is Mr. Markel?

38. If \$79$\frac{1}{3}$ are $\frac{7}{9}$ of the cost of 1 horse, what would be the cost of 15 horses?

39. A merchant bought books for \$232, which were $\frac{8}{11}$ of what he received for them. What was his gain?

40. Eighteen are $\frac{3}{7}$ of what number? 91 are $\frac{7}{9}$ of what number? 144 are $\frac{3}{8}$ of what number?

41. If 24 are $\frac{3}{5}$ of a number, what are 6 times the number?

42. If 48 are $\frac{4}{5}$ of a number, what are 7 times the number?

43. Eighteen are $\frac{3}{5}$ of $\frac{4}{15}$ of what number?

44. Five sixths of 36 are $\frac{2}{15}$ of what number?

45. Seven eighths of 56 are $\frac{7}{9}$ of what number?

46. If \$95 are $\frac{19}{21}$ of the cost of a horse, find the cost of 12 horses.

47. A sold his store for \$3,600. If $\frac{4}{5}$ of $\frac{3}{8}$ of the cost of the store equal $\frac{1}{2}$ of the selling price, what was his gain or loss?

48. B sold his ship for \$9,600, which were $\frac{6}{7}$ of 4 times the cost. Was there a gain or loss, and how much?

49. Jennie has 63 pigeons, which are $\frac{7}{9}$ of the number Frank has. How many pigeons has Frank?

50. I paid 96 cents for 12 pounds of sugar. At that rate what will $2\frac{2}{3}$ pounds cost?

SOLUTION.—Since 12 pounds of sugar cost 96 cents, 1 pound cost $\frac{1}{12}$ of 96 cents, or 8 cents, and $2\frac{2}{3}$, or $\frac{8}{3}$ pounds, will cost $\frac{8}{3}$ times 8 cents, which are $\frac{64}{3}$ cents, or $21\frac{1}{3}$ cents. Therefore, etc.

51. If Louis earns \$54 in 9 days, how many dollars will he earn in $7\frac{3}{4}$ days?

52. When 9 dozen jars hold 27 gallons, how many gallons will $1\frac{1}{3}$ dozen jars hold?

53. When 30 acres of land yield 1,500 bushels of oats, how many bushels will $20\frac{1}{3}$ acres yield?

54. If $\frac{5}{8}$ of 36 acres yield 600 bushels of wheat, how many bushels will $12\frac{4}{5}$ acres yield?

55. If $\frac{5}{6}$ of 18 cords of wood are worth $45, what will $6\frac{7}{9}$ cords be worth?

56. If 3 pounds of beef cost 54 cents, what will $6\frac{5}{8}$ pounds cost?

57. If 7 gallons of cream cost $3, what will $9\frac{1}{3}$ gallons cost?

58. What must I pay for $6\frac{3}{5}$ bushels of corn, at the rate of 12 bushels for $3.60?

59. A farmer had $\frac{7}{9}$ of 63 sheep, and sold $\frac{6}{7}$ of them. How many sheep had he left?

60. If 4 bags hold $9\frac{3}{5}$ bushels of grain, how many bushels will $6\frac{1}{4}$ bags hold?

61. What will $7\frac{2}{5}$ sacks of sugar weigh, if 12 sacks weigh 48 pounds?

62. If $\frac{7}{8}$ of 40 bushels of peaches cost $70, what will $6\frac{1}{8}$ bushels cost?

63. George is 24 years old, and $\frac{5}{6}$ of his age are $\frac{4}{7}$ of Clara's age. What is Clara's age?

64. When 9 bushels of wheat sell for $7.20, what should be received for $7\frac{1}{2}$ bushels?

65. If 12 quarts of berries cost $2.40, what will $6\frac{3}{4}$ quarts cost?

66. If Maud paid $1.08 for 9 yards of ribbon, what should she pay for $3\frac{3}{4}$ yards?

67. If 8 bushels of chestnuts cost $48, what will $5\frac{1}{4}$ bushels cost?

68. Albert earned $63 in 9 weeks. How many dollars will he earn in $5\frac{1}{7}$ weeks at the same rate?

69. If 5 bushels of chestnuts cost $15, what will $7\frac{7}{8}$ bushels cost?

**70.** When $\frac{2}{3}$ of 9 pounds of cheese cost 96 cents, what will $4\frac{5}{8}$ pounds cost?

**71.** Sarah's age, being doubled and increased by $\frac{5}{6}$ of her age, equals 51 years. How old is she?

**72.** When eggs sell at the rate of 3 for 7 cents, what are $5\frac{5}{7}$ dozen worth?

**73.** If $\frac{5}{6}$ of $3\frac{3}{5}$ dozen oranges are worth 45 cents, what are $2\frac{3}{4}$ dozen worth?

**74.** 9 times Walter's money increased by $\frac{4}{5}$ of his money equal $\frac{7}{8}$ of \$112. How much money has Walter?

**75.** If $\frac{5}{6}$ of a bushel of wheat cost 60 cents, what will $\frac{7}{1\frac{1}{2}}$ of a bushel cost at the same rate?

SOLUTION.—If $\frac{5}{6}$ of a bushel of wheat cost 60 cents, $\frac{1}{6}$ of a bushel cost $\frac{1}{5}$ of 60 cents, or 12 cents, and $\frac{6}{6}$, or 1 bushel, will cost 6 times 12 cents, or 72 cents; then $\frac{1}{1\frac{1}{2}}$ of a bushel will cost $\frac{1}{1\frac{1}{2}}$ of 72 cents, or 6 cents, and $\frac{7}{1\frac{1}{2}}$ of a bushel will cost 7 times 6 cents, or 42 cents. Therefore, if $\frac{5}{6}$ of a bushel of wheat cost 60 cents, $\frac{7}{1\frac{1}{2}}$ of a bushel at the same rate will cost 42 cents.

**76.** Three fourths of my monthly salary are \$45. What would I earn in $\frac{9}{10}$ of a month?

**77.** If $3\frac{1}{2}$ bushels of coal weigh 280 pounds, what will $4\frac{3}{4}$ bushels weigh?

**78.** If $\frac{3}{4}$ of the cost of a horse are \$78, what is the selling price provided he is sold for $\frac{1\frac{2}{3}}{1\frac{1}{3}}$ of the cost?

**79.** If there are 112 hours in $\frac{2}{3}$ of a week, how many hours are there in $\frac{7}{8}$ of a week?

**80.** If $3\frac{3}{4}$ bushels of chestnuts cost \$15, what will $7\frac{7}{8}$ bushels cost?

**81.** When $\frac{5}{7}$ of a barrel weigh 140 pounds, what will $\frac{3}{4}$ of a barrel weigh?

**82.** If a ship sails 64 miles in $3\frac{1}{3}$ hours, how far will she sail in $2\frac{1}{3}$ hours?

**83.** When $3\frac{2}{3}$ dozen oranges are worth 44 lemons, how many lemons are worth $2\frac{3}{4}$ dozen oranges?

**84.** If Andrew can mow $\frac{2}{3}$ of an acre of grass in $9\frac{1}{3}$ hours, how many acres can he mow in $\frac{6}{7}$ of an hour?

**85.** How many Bibles at $\$6\frac{1}{4}$ each can I get for 7 dictionaries at $\$10\frac{5}{7}$ apiece?

**86.** Seven eighths of my income equal $\frac{3}{4}$ of my brother's income, which is $84 a month. What is my monthly income?

**87.** If $\frac{4}{9}$ of the pupils in a school are 20, how many pupils are there in $\frac{8}{9}$ of the school?

**88.** When $3\frac{1}{2}$ dozen pears are worth 70 cents, how much are $3\frac{1}{4}$ dozen worth?

**89.** How many pounds of tea at $\$\frac{5}{8}$ a pound can I get for 6 pairs of chickens at $\$\frac{5}{8}$ a pair?

**90.** If $\frac{3}{5}$ of a barrel of beef cost $\$12\frac{3}{4}$, what will $\frac{4}{7}$ of a barrel cost?

**91.** Since $\frac{4}{15}$ of a bushel of potatoes weigh 16 pounds, what will $6\frac{3}{4}$ bushels weigh?

**92.** If Jane earns $25 in $2\frac{1}{2}$ weeks, how much can she earn in $6\frac{2}{3}$ weeks?

**93.** What will $\frac{3}{5}$ of a yard of cloth cost if $\frac{4}{5}$ of a yard cost $\$\frac{2}{7}$?

**94.** If $2\frac{2}{3}$ bushels of clover seed cost $\$13\frac{1}{3}$, what will $3\frac{2}{3}$ bushels cost?

**95.** What must be paid for $3\frac{1}{5}$ pounds of fish, if $1\frac{1}{2}$ pounds cost $16\frac{1}{2}$ cents?

**96.** Five eighths of the cost of a horse equal $\frac{9}{16}$ of the selling price. Find the selling price, if the horse cost $96.

**97.** Seven eighths of $\frac{3}{14}$ of Hannah's age equal $\frac{3}{16}$ of Rose's age. If Hannah's age equals 48 years, how old is Rose?

**98.** How much will $7\frac{1}{3}$ pounds of sugar cost, if $3\frac{2}{3}$ pounds cost 24 cents?

**99.** If $\frac{1}{8}$ of an acre of ground yields 70 quarts of berries, how many quarts will $1\frac{1}{2}$ acres yield?

**100.** How much will $8\frac{1}{2}$ pounds of tea cost, if $6\frac{1}{4}$ pounds cost \$2.50?

**101.** Roy lost $\frac{3}{8}$ of his marbles and had 35 left. How many marbles had he at first?

SOLUTION.—Since Roy lost $\frac{3}{8}$ of his marbles, he had left $\frac{8}{8}$ minus $\frac{3}{8}$, or $\frac{5}{8}$ of his marbles, which equal 35 marbles. Since $\frac{5}{8}$ of his marbles equal 35 marbles, $\frac{1}{8}$ of his marbles equals $\frac{1}{5}$ of 35 marbles, or 7 marbles, and $\frac{8}{8}$ of his marbles equal 8 times 7 marbles, or 56 marbles. Therefore, etc.

**102.** Mary spent $\frac{8}{11}$ of her money and had \$21 left. How much money had she at first?

**103.** Harvey sold $\frac{1}{3}$ of his wheat at one time, $\frac{1}{4}$ at another, and had 500 bushels left. How many bushels had he at first?

**104.** If a man spent $\frac{1}{4}$ of $\frac{5}{6}$ of his wages and had \$95 left, what were his wages?

**105.** Norman sold $\frac{2}{5}$ of his quinces, and after giving away $\frac{1}{7}$ of the remainder, had 18 left. How many quinces had he at first?

**106.** After spending $\frac{5}{6}$ of his money, and losing $\frac{4}{5}$ of the remainder, Grant had \$1. How much money had he at first?

**107.** F's watch-chain cost \$7, which were \$2 less than $\frac{9}{15}$ of the cost of his watch. What did the watch cost?

**108.** Guy found 15 marbles and lost 19, and then had $\frac{1}{5}$ of what he had at first. How many had he at first?

**109.** In an orchard $\frac{3}{8}$ of the trees are apple, $\frac{2}{7}$ of the remainder are peach, and 24 are pear trees. How many apple and how many peach trees are there?

**110.** Ira spent $\frac{3}{5}$ of his money, earned $\frac{2}{3}$ as much as he had left, and then had \$66. How much had he at first?

111. Rufus spent $\frac{1}{4}$ of his money, earned $\frac{8}{9}$ as much as he spent, and then had \$70. How much money had he at first?

112. Daniel sold his horse for $\frac{3}{4}$ of the cost and lost \$30. What would he have gained by selling it at $\frac{6}{5}$ of the cost?

113. Seven eighths of 56 are how many ninths of 63?

114. Five sixths of 78 are $\frac{13}{18}$ of 25 times what number?

115. Two thirds of $\frac{3}{4}$ of 48 are what fraction of $\frac{3}{8}$ of 256?

116. Seven eighths of $\frac{4}{5}$ of 100 are $\frac{10}{13}$ of 7 times what number?

117. Five sevenths of 56 are $\frac{2}{3}$ of how many times $\frac{4}{5}$ of 75?

118. I spent $\frac{1}{3}$ of my money, lost $\frac{1}{3}$ of the remainder, then found as much as I had spent and $\frac{1}{2}$ of what I had lost, and then had \$48. How much money had I at first?

119. Edmund spent $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{6}$ of his money, and found that \$27 was $\frac{9}{13}$ of what he still had. How much money had he at first?

120. Meade has 48 books, Mary $\frac{3}{4}$ as many as Meade, and Jennie $\frac{2}{3}$ as many as Mary. How many books have Mary and Jennie respectively?

121. One eighth of a pole is in the ground, $\frac{1}{5}$ as much is in the water, and 68 feet are in the air. How long is the pole?

122. A man after spending $\frac{3}{4}$ of his money, found that \$20 were $\frac{2}{5}$ of what he had left. What was the amount he originally had?

123. After spending $\frac{5}{6}$ of his money, Ralph earned $\frac{7}{8}$ as much as he had at first, and then had \$190. What had he at first?

124. Two fifths of Howard's marbles equal $\frac{4}{5}$ of Albert's, and $\frac{5}{6}$ of Albert's equal $\frac{5}{8}$ of Herbert's. How many has each, if Herbert has 40?

125. Said A to B, "If to my age you add its $\frac{1}{2}$ and $\frac{2}{5}$, the sum will be 38 years." What was A's age?

## REVIEW PROBLEMS

1. At $\$\frac{5}{8}$ apiece, how many ducks can be bought for \$25?

2. What will $3\frac{1}{2}$ pounds of meat cost if 4 pounds cost $\$\frac{3}{4}$?

3. If $\$13\frac{1}{3}$ are spent for $2\frac{1}{2}$ dozen doilies, how much does each doily cost?

4. If Horace earns $\$2\frac{1}{5}$ a day and spends $\frac{3}{5}$ of it, how long will it take him to save \$44?

5. If it takes 1 man $9\frac{3}{5}$ days to do a piece of work, how long will it take 6 men?

6. If a man travels $14\frac{2}{5}$ miles in $4\frac{1}{2}$ hours, how far can he travel in $6\frac{7}{8}$ hours?

7. If a wheel turns $4\frac{5}{8}$ times in going 116 feet, what is its circumference?

8. A horse which was sold for $2\frac{2}{3}$ times its cost brought \$240. What was the cost?

9. For 12 bushels of wheat worth $\$\frac{7}{8}$ a bushel, Clarence received potatoes worth $\$1\frac{9}{2}$ a bushel. How many bushels of potatoes did he receive?

10. If 4 men can do a piece of work in $6\frac{3}{4}$ days, how long will it take 8 men to do the same work?

11. How far can a man walk in 13 hours, if he walks 13 miles in $4\frac{1}{3}$ hours?

12. John owned $\frac{3}{4}$ of an engine, and sold $\frac{2}{5}$ of his share for \$1,800. What was the value of the engine?

13. If $\frac{2}{3}$ of $\frac{3}{4}$ of a number are $47\frac{1}{2}$, what is the number?

14. When the difference between $\frac{6}{7}$ and $\frac{5}{8}$ of a number is 39, what is the number?

15. Five and three sevenths pounds of coffee cost 32 cents more than do $4\frac{2}{7}$ pounds. What is the price per pound?

16. If \$618 were paid for $\frac{3}{5}$ of $20\frac{3}{5}$ acres of land, what was the price per acre?

17. If A travels $1\frac{1}{3}$ times as fast as B, and B travels 9 miles per hour, in how many hours will A overtake B, who has a start of 54 miles?

18. How many yards of ribbon can be bought for \$12, if 5 yards cost \$6?

19. After traveling 6 hours at the rate of $5\frac{1}{2}$ miles per hour, I am still $\frac{9}{20}$ of the distance from the end of my journey. What is the distance?

20. How many bushels of wheat will 4 acres produce, if $5\frac{1}{2}$ acres produce 99 bushels?

21. If Mr. Cooper paid $\frac{7}{8}$ of \$12 for clover seed at \$3 per bushel, how many bushels did he buy?

22. If B sold $\frac{4}{5}$ of his land, then bought $\frac{7}{8}$ as much as he had left, and then had 60 acres, how many acres had he at first?

23. Bert rides east at the rate of $17\frac{1}{2}$ miles in $1\frac{2}{3}$ hours, and Albert rides west at the rate of $25\frac{1}{2}$ miles in $2\frac{3}{7}$ hours. How far apart will they be in 6 hours?

24. If \$48 are $\frac{16}{17}$ of what was paid for wood at \$8 per cord, how many cords were bought?

25. If $\frac{5}{9}$ of what a horse cost equal $\$22\frac{1}{2}$, which equal the cost of a cow, what did they both cost?

26. By selling 7 yards of ribbon at $\$2\frac{1}{7}$ per yard, I received $\frac{5}{8}$ as much money as the ribbon I had left was

worth at $3\frac{1}{8}$ per yard. How many yards of ribbon had I at first?

27. If $\frac{6}{7}$ of $16\frac{1}{3}$ equal $\frac{6}{11}$ of what a man paid for $25\frac{3}{8}$ tons of coal, what is the price per ton?

28. If I had $\frac{3}{4}$ as many pigs, $\frac{8}{13}$ of them would number 24. How many have I?

29. What was received for a bill of goods if $\frac{3}{13}$ of the list price equal $\frac{3}{4}$ of the discount, when they were listed at $520?

30. If $1\frac{1}{2}$ times $1\frac{1}{8}$ times the distance from Philadelphia to New York are 165 miles, what is the distance?

31. A drover had 144 sheep in a field, of which $\frac{4}{5}$ the number of acres equal $\frac{5}{8}$ the number of sheep it contains. What is the land worth at $50 an acre?

32. Ira pays $\frac{5}{8}$ of $\frac{1}{10}$ of his salary for $\frac{7}{8}$ of his rent. If the rent is $240, what is his salary?

33. What fraction must be added to $\frac{3}{8}$ to make $\frac{8}{11}$?

34. If one of two numbers is $8\frac{3}{4}$, and their sum is $15\frac{1}{2}$, what is the other number?

35. After Mary had lost $\frac{3}{5}$ of her beads, and given away $\frac{3}{10}$ of them, what part of the beads she had at first still remained?

36. The sum of two numbers is $45\frac{3}{8}$, and their difference is $6\frac{5}{6}$. What are the numbers?

37. If the greater of two numbers is $7\frac{3}{5}$, and their difference is $2\frac{3}{7}$, what is their sum?

38. If the difference between two numbers is $5\frac{3}{8}$, and their sum is $26\frac{1}{2}$, what are the numbers?

39. If the smaller of two numbers is $14\frac{3}{8}$, and their difference is $16\frac{5}{8}$, what are the numbers?

40. If the quotent is $\frac{7}{8}$, and the dividend $8\frac{3}{4}$, what is the divisor?

41. If a man owned $\frac{9}{10}$ of a factory, and sold $\frac{2}{7}$ of his share, what fraction of the whole factory did he then own?

42. If Benton bought a horse and saddle for $132, and the saddle cost $\frac{2}{9}$ as much as the horse, what did each cost?

43. If $\frac{5}{7}$ of Andrew's age equal $\frac{7}{8}$ of 32 years, how old is he?

44. Mamie bought 8 rugs at $\$1\frac{7}{8}$ apiece, and had $\$15\frac{1}{2}$ left. How much money had she at first?

45. Arnold bought a pair of skates for $\frac{3}{5}$ of $\$2\frac{1}{2}$. What fraction of a dollar did he spend?

46. Francis spent $\frac{3}{5}$ of his money, then earned $\frac{6}{7}$ as much as he spent, when he had $28. How much had he at first?

47. If a boy lost $\frac{3}{4}$ of his money, and then found that $\$5\frac{1}{6}$ were $7\frac{3}{4}$ times what he had left, how much money had he at first?

48. If the goods in a store are worth $2,400, and $\frac{5}{8}$ of their value equal $\frac{5}{9}$ of 3 times the value of the store, and all are burned, what is the loss?

49. If $5\frac{1}{3}$ dozen eggs cost $\$1\frac{7}{9}$, what is the cost per egg?

50. C, owning $\frac{10}{13}$ of a furnace, sold $\frac{5}{6}$ of his share for $2,500. What was the furnace worth?

51. If a man rides 100 miles in $7\frac{1}{7}$ hours, how far can he ride in $5\frac{1}{3}$ hours?

52. A stationer sells tablets at 25 cents a dozen, and $\frac{3}{5}$ of the selling price equal $\frac{5}{4}$ of the cost. Find the gain or loss per dozen?

53. After losing $\frac{5}{6}$ of $\frac{3}{5}$ of what she had, Lulu has 35 pansies. How many had she at first?

54. If a dictionary cost $10, and $\frac{3}{4}$ of $\frac{4}{5}$ of this sum equal $\frac{2}{5}$ the value of 10 readers, what are the readers worth apiece?

55. If an apple costs $\frac{3}{4}$ as much as a peach, and 4

dozen apples cost 48 cents, what are the peaches worth a dozen?

56. If B can do a piece of work in 7 days, and A can do it in 5 days, in what time can they both do the work?

57. If 3 men can do a piece of work in 6 days, and 2 of them can do it in 8 days, in what time can the third do the work when working alone?

58. What are $\frac{5}{12}$ of a farm worth, if $\frac{2}{3}$ of it are worth $4,000?

59. If 7 be added to each term of the fraction $\frac{13}{14}$, what difference will it make in the value of the fraction?

60. Truman, having lost $\frac{3}{5}$ of his kite string, added $21\frac{1}{3}$ feet, and then had $\frac{6}{5}$ of the original length. How long was the string then?

61. If 4 men earn $\$9\frac{1}{3}$ a day, what will 7 men earn?

62. A man exchanged 10 bushels of clover seed for $23\frac{1}{3}$ bushels of wheat at $\$1\frac{1}{5}$ a bushel. What was the price per bushel of the clover seed?

63. Two fifths of $\frac{5}{8}$ of a school of 75 pupils are girls. How many are boys?

64. Ethan sold a knife for 35 cents, which were $\frac{2}{3}$ more than it cost. What was the cost?

65. A man who owned $\frac{7}{8}$ of a store sold $\frac{2}{3}$ of $\frac{5}{6}$ of his share for $\frac{7}{8}$ of $400. What was the value of the store?

66. Lulu is $\frac{3}{10}$ as old as her mother, and her mother is $\frac{5}{8}$ as old as Lulu's grandmother. If the grandmother is 72 years old, how old is Lulu?

67. If I owned $\frac{2}{3}$ of a ranch and sold $\frac{4}{5}$ of my share for $6,400, what was the whole ranch worth?

68. If Lucy earns $\$\frac{8}{9}$ per day, and her expenses are $\$4\frac{1}{2}$ per week, what can she save in 1 year?

69. Matthew bought a carload of coal weighing $17\frac{1}{2}$

tons, and sold his neighbor $\frac{3}{5}$ of it at $3 a ton. What did the neighbor pay for his coal?

70. A can cut a cord of wood in $\frac{3}{5}$ of a day, and B in $\frac{2}{7}$ of a day. How many cords can both cut in 1 day?

71. If a live goose weighed $12\frac{1}{2}$ pounds, and lost $\frac{2}{5}$ in being dressed, what did the dressed goose cost per pound, if the live goose cost 12 cents per pound?

72. If a man can dig a ditch in $6\frac{3}{4}$ days, how long will it take 4 men to dig a ditch 2 times as long?

73. If a miller takes $\frac{1}{8}$ for toll, how many bushels must a customer take to the mill that he may bring away $16\frac{1}{3}$ bushels?

74. If $63 are $\frac{7}{9}$ of my money, what fraction of my money will I have after I earn $12 more?

75. Mr. Ketchem sold $\frac{2}{3}$ of $5\frac{1}{4}$ cords of bark for $\frac{7}{8}$ of $24. What did he receive per cord for the bark?

76. A flag pole 153 feet high was blown down and broken so that $\frac{3}{4}$ of the shorter equalled $\frac{2}{3}$ of the longer piece. What was the length of each piece?

77. A kite string was broken so that $\frac{5}{6}$ of the longer piece equalled $\frac{7}{8}$ of the shorter. How long was the string, if the shorter piece measured 80 feet?

78. Clara, after spending $\frac{1}{3}$ of a dollar more than $\frac{2}{3}$ of her money, found that she had $15. How much had she at first?

79. If the sum of two numbers equals 154, and one equals $\frac{5}{6}$ of the other, what are the numbers?

80. If Grier can do $\frac{2}{3}$ as much work as Claude, in what time can they each do a piece of work, if both can do it in 5 days?

81. If 30 men can load a boat in 7 days, how many men will be required to load it in $1\frac{3}{7}$ days?

82. If $\frac{7}{8}$ of a yard of elastic cost $12\frac{1}{4}$ cents, what will $2\frac{5}{8}$ yards cost?

83. A student paid $\frac{1}{3}$ of his money for board, $\frac{1}{3}$ of the remainder for tuition, $\frac{1}{3}$ of what still remained for books, and then had $25. How much money had he at first?

84. If $\frac{3}{4}$ of the number of Mary's peaches equal $\frac{5}{6}$ of the number of Clara's, and the difference between their numbers is 8, how many has each?

85. Ellis has 3 pigs that weigh 420 pounds. If the first weighs $\frac{3}{4}$ as much as the second, and the third weighs $\frac{1}{2}$ as much as the other two, what does each weigh?

86. One sixth of a number is 12 more than $\frac{1}{7}$ of it. What is the number?

87. If Agnes spent $\frac{2}{5}$ of her money for a dress and $\frac{3}{5}$ of the remainder for a bonnet, and had $\$7\frac{1}{5}$ left, how much money had she at first?

88. If $\frac{2}{3}$ of John's money equal $\frac{3}{4}$ of Fred's, and $\frac{1}{2}$ of Fred's equals $\frac{2}{3}$ of Grant's, and they all have $460, how much has each?

89. If 96 are $\frac{4}{5}$ of a number, what are $1\frac{1}{2}$ of the same number?

90. Find the sum, difference, product and quotient of $\frac{5}{6}$ and $\frac{7}{8}$?

91. If the product of the sum and difference of two numbers is $\frac{5}{8}$, and the difference is $\frac{3}{4}$, what are the numbers?

92. If Russell sold 2 horses at $150 each, and gained $\frac{2}{3}$ on one and lost $\frac{2}{3}$ on the other, how much did he gain or lose by the transaction?

93. Mr. Clemens sold $\frac{1}{5}$ of his chickens to one man, $\frac{1}{4}$ of the remainder to another, and $\frac{1}{3}$ of what were left to

a third, and still had 400 remaining. How many had he at first?

94. George can pick a patch of berries in $4\frac{1}{2}$ days, and Hiram in $5\frac{1}{3}$ days. In what time can they both do the work?

95. If Ralph plows $\frac{1}{2}$ an acre in the same time that Albert plows $\frac{1}{3}$ of an acre, how many acres will each plow while the other plows 10 acres?

96. A man divided some money among his 3 children, giving to the eldest $\frac{2}{5}$ of it, to the second \$5, and to the third as much as to the other two. How much did the first and third receive?

97. From a tank $\frac{3}{4}$ full of water 12 gallons were drawn, after which it was $\frac{2}{3}$ full. What will the tank hold?

98. If one factor of 12 is $2\frac{1}{2}$, what is the other factor?

99. Jacob bought a horse for \$60, which are $5\frac{1}{3}$ times $\frac{4}{7}$ of the cost of the saddle. Find the cost of the saddle.

100. Find the gain or loss when $\frac{3}{5}$ of the selling price equal $\frac{5}{8}$ of the cost.

101. If $\frac{3}{8}$ of the trees in an orchard bear apples, $\frac{2}{7}$ bear plums, and the remainder, 66, bear pears, how many trees are there in the orchard?

102. If a man drives 21 miles in $3\frac{1}{2}$ hours, how far will he drive in $5\frac{1}{3}$ hours?

103. Susan having 75 pins lost $\frac{3}{5}$ of them, and then found $\frac{2}{5}$ as many as remained. How many pins did she then have?

104. If Luther spent 42 cents, which were $\frac{7}{12}$ of 8 times what he had left, how many cents had he at first?

105. Arthur gave $\frac{1}{6}$ of his marbles to Murray and 3 times $\frac{1}{7}$ of them to William. How many had he at first, if he then had 34?

106. How many eggs at $\$\frac{2}{5}$ a dozen will pay for 12 bushels of potatoes at $\$\frac{1}{2}$ per bushel?

107. How much will 10 boxes of paper cost, if 3 boxes cost $\$5\frac{1}{4}$?

108. Truman bought a suit for $45. Eight ninths of this were 10 times the cost of a hat, and $\frac{8}{9}$ of the cost of an overcoat. He then had $\frac{1}{2}$ as much money as he had spent. How much money had he at first?

109. Mattie gave $\frac{5}{6}$ of her money for benovelent purposes, and then found $\frac{8}{15}$ of what she had given, when she had $22. How much money had she at first?

110. John drew $\frac{3}{5}$ of his money from the bank, and after spending $\frac{7}{8}$ of it returned the remainder, which was $24. How much money had he in bank at first?

111. Eva has $\frac{3}{4}$ of $60, which are $1\frac{1}{5}$ times what Jennie has. How much money have both?

112. Edwin bought cattle for $600, and sold them at a gain of $\frac{1}{20}$, thereby gaining $\$1\frac{1}{2}$ each. How many cattle were there?

113. Luther had 100 yards of tape, and sold $\frac{2}{5}$ of it to Mary, and $\frac{5}{12}$ of the remainder to Anna. What is the remainder worth at 10 cents a yard?

114. Two fifths of a school study reading, $\frac{5}{9}$ of the remainder study history, and the remainder, or 16, study algebra. How many pupils are there in the school?

115. At the rate of 7 for 10 cents, how many pears can be obtained for 80 cents?

116. If $\frac{7}{8}$ of a pound of fish cost $17\frac{1}{2}$ cents, what will $6\frac{2}{5}$ pounds cost?

117. If $\frac{3}{4}$ of an acre of land cost $\frac{2}{3}$ of $180, what will $\frac{3}{5}$ of an acre cost?

118. When bananas cost 35 cents a dozen, what do 3 cost at the same rate?

119. If $\frac{5}{6}$ of a carload of fruit are worth \$120, what are $\frac{7}{8}$ of a carload worth?

120. If 2 pipes lead into a cistern, while a third leads from it, in what time can the cistern be filled, if it is empty and all the pipes are opened at the same time, provided the first could fill it in $3\frac{1}{2}$ hours, the second in $4\frac{1}{2}$ hours, while the third, if running alone, could empty it in $2\frac{1}{3}$ hours?

121. Henry, having 90 chestnuts, gave away $\frac{2}{3}$ of them, and ate $\frac{5}{6}$ of the remainder. How many chestnuts had he then?

122. A traveling man in making a journey of 180 miles went $\frac{1}{6}$ the distance the first day, $\frac{1}{5}$ of the remaining distance the second day, $\frac{1}{4}$ of the remaining distance the third day, $\frac{1}{3}$ of the remaining distance the fourth day, $\frac{1}{2}$ of the remaining distance the fifth day, and finished the sixth day. How far did he travel each day?

123. Of a flock of sheep, $\frac{1}{6}$ is in one field, $\frac{1}{4}$ in another, and $\frac{2}{5}$ of the remainder, or 28, are in a third. How many sheep are there?

124. After spending $\frac{1}{7}$ of my money, losing $\frac{1}{6}$ of the remainder, and giving away $\frac{2}{5}$ of what was then left, I have \$36. How much money had I at first?

125. If Thomas can do a piece of work in $6\frac{3}{4}$ days, working 8 hours a day, in how many days can he do it if he works 12 hours a day?

126. By selling a horse for \$48, I lost $\frac{4}{7}$ of his value. What was his value?

127. By selling a horse at a loss of \$48, I lost $\frac{4}{7}$ of his value. What was his value?

128. By selling a horse for \$48, I gained $\frac{5}{7}$ of his value. What was the value of the horse?

129. By selling a horse at a gain of \$48, I gained $\frac{4}{7}$ of his value. What was the value of the horse?

130. If $\frac{4}{5}$ of my money are $\frac{4}{9}$ of the value of a buggy, and $\frac{2}{5}$ of the value of the buggy are \$18, how much money have I?

131. If 9 pounds of prunes are worth $73\frac{1}{5}$ cents, what are 7 pounds worth?

132. Ralph has $\$4\frac{5}{6}$ and Howard has $\$6\frac{2}{3}$. If they divide their money equally among 3 persons, how much does each receive?

133. How much will I gain on 20 ducks if I buy them at the rate of 3 for \$2, and sell them at the rate of 2 for \$3?

134. At the rate of 5 for \$9, how many pigs can I buy for \$35 and have \$8 left?

135. Amos bought a sheep for $\frac{2}{7}$ of his money, and 6 pigs at \$3 each with $\frac{3}{7}$ of what was left. How much money had he at first?

136. By how much does the sum of $1\frac{5}{8}$ and $\frac{9}{10}$ exceed their difference?

137. What must be added to the difference between $\frac{1}{2}$ and $\frac{1}{4}$ to make $\frac{1}{8}$?

138. What are the two fractions whose difference is $\frac{1}{6}$ and whose sum is $\frac{5}{6}$?

139. If the product of two factors is $\frac{3}{4}$ and the less is $\frac{2}{3}$, what is the greater?

140. A man owning $\frac{2}{5}$ of a store sold $\frac{2}{3}$ of his share. What fraction of the store does he still own?

141. If cloth costs 48 cents a yard, and is sold at a gain of $\frac{1}{3}$, what is the selling price?

142. If the width of a room is $\frac{3}{5}$ of its length, and it is 15 feet wide, what is the distance around it?

143. If a boy earns $\$6\frac{1}{2}$ a week, and spends $\$4\frac{1}{4}$, how many weeks will it take him to save \$28?

144. Of three gas jets, the first burns $\frac{4}{5}$ as much as the second, and the second burns $\frac{2}{3}$ as much as the third. How much will the first and second burn while the third burns 1,200 cubic feet?

145. Fred spent $\frac{1}{5}$ of his money, lost $\frac{1}{6}$, and gave away $\frac{1}{4}$, when he had $\$1\frac{3}{4}$ less than half of his money. How much money had he at first?

146. From a tank $\frac{3}{4}$ full of water 20 gallons were taken, and then 35 were added, when the tank was just $\frac{7}{8}$ full. What was the capacity of the tank?

147. If a merchant bought cloth at $\$1\frac{1}{4}$ a yard and sold it at $\$1\frac{1}{3}$ a yard, what did he gain on the dollar?

148. If you increase a number by 29 more than $\frac{5}{8}$ of it, the sum will be 113. What is the number?

149. Israel had $\frac{3}{5}$ of a dollar and spent $\frac{3}{8}$ of it. How much money had he left?

150. If $\frac{3}{8}$ of a gallon of vinegar cost 27 cents, what will $2\frac{3}{5}$ gallons cost?

151. A bought $\frac{1}{2}$ of a ton of coal at one time, $\frac{5}{8}$ of a ton at another, and $1\frac{3}{4}$ tons at another time. What did it all cost at $4.50 per ton?

152. If to $\frac{5}{6}$ of my age, you add $\frac{2}{3}$ of $\frac{3}{5}$ of it, the sum will be 53 years. How old am I?

153. If 4 men can do a piece of work in $10\frac{1}{2}$ days, in how many days can 7 men do it?

154. If 6 men can do a piece of work in 12 days, how long will it take 5 men to do the same work?

155. If 8 men can do a piece of work in 10 days, how long will it take 10 men to do the half of it?

156. How many pigs can be bought for $77 at the rate of 4 for $11?

157. If a force of 90 men can lay 4 miles of trolley-

road in 8 days, how many men must be added to the force to do the same work in 5 days?

158. Norman has $\$5\frac{1}{4}$ and Harry has $\$6\frac{3}{4}$. If they divide their money equally among three persons, how much money does each receive?

159. Bertha is $\frac{3}{11}$ as old as her father, and $\frac{4}{15}$ as old as her mother. If she is 24 years old, how old are her mother and her father?

160. By selling a horse for \$125 I gained $\frac{6}{19}$ of the cost. Find the cost.

161. Reuben sold a bicycle for \$70, and thereby gained $\frac{2}{7}$ of the cost. Find the cost.

162. If a bushel of rye cost $\$\frac{3}{4}$, and a bushel of wheat $\$1\frac{1}{10}$, what is the difference between the costs of 7 bushels of each?

163. If a man's wages for $8\frac{1}{3}$ weeks are \$50, what will be his wages for $4\frac{3}{4}$ weeks?

164. Henry and John contracted to do some work for \$500. Henry furnished 8 men for 5 days and John furnished 10 men for 6 days. How much money should each receive?

165. If 1 man earns \$50 in $3\frac{1}{3}$ weeks, how much will 12 men earn in 6 weeks?

166. I sold my house for $\frac{3}{5}$ of the cost. If I had sold it for 3 times as much I would have gained \$1,600. What was the cost?

167. Samuel bought a desk for \$32 and sold it at a gain of $\frac{4}{25}$ of the cost. Find the selling price.

168. A woman bought a bureau for \$56 and sold it so that $\frac{2}{5}$ of the selling price was gain. What was the selling price?

169. How many yards of matting at $\$\frac{5}{8}$ per yard can be bought for $\$6\frac{1}{2}$?

**170.** A boy walks at the rate of $2\frac{1}{2}$ miles an hour, and a man walks at the rate of 4 miles an hour. In how many hours will the man overtake the boy, who has a start of 12 miles?

**171.** A man spent $\frac{4}{15}$ of his money the first year, and $\frac{2}{3}$ as much the second. What part does he still have?

**172.** If I own $\frac{7}{8}$ of a mill, and $\frac{2}{3}$ of my share is worth \$2,800, what is the mill worth?

**173.** Edward earned \$10, then lost $\frac{2}{5}$ of what he had earned, and then had $\frac{3}{2}$ as much as at first. How much had he at first?

**174.** If to $\frac{3}{5}$ of A's money you add \$77 the sum will equal $\frac{7}{8}$ of his money. How much money had he?

**175.** A boat sailed up a stream 16 miles more than $\frac{7}{8}$ of the distance it sailed down. If the entire distance sailed was 76 miles, how far did it sail each way?

**176.** If $\frac{3}{4}$ of a man's age, doubled and increased by $\frac{5}{6}$ of his age, equal 56 years, how old is he?

**177.** Sallie gave Cora $\frac{3}{5}$ of an orange, Cora gave Kate $\frac{2}{3}$ of her share, and Kate gave Grace $\frac{3}{4}$ of her share. What part of the orange did each retain?

**178.** Truman lost $\frac{3}{4}$ of his money, found $\frac{2}{5}$ as much as he had lost, spent $\frac{1}{2}$ as much as he then had, and now has \$92. How much had he at first?

**179.** If 8 men can do a piece of work in 5 days, how long will it take 5 men to finish the work after 10 men have worked at it 2 days?

**180.** Ten men can do a piece of work in 5 days. If 12 men have worked at it 3 days, how many men will be required to finish the work in 1 day?

**181.** Five men can do a piece of work in 8 days. How many men will be required to finish the work in $\frac{1}{2}$ of a day, if 6 men have worked at it 6 days?

182. How many men will be required to finish a piece of work in $\frac{2}{3}$ of a day, if 4 men can do the work in 6 days, and 5 men have worked at it 4 days?

183. A can do a piece of work in $3\frac{1}{3}$ days, B in $2\frac{1}{2}$ days, and C in 5 days. After C has worked $1\frac{1}{2}$ days, how long will it take the 3 men to finish the work?

184. A can do a piece of work in $4\frac{1}{2}$ days, and B in $6\frac{3}{4}$ days. In what time can they do it working together? What should each man receive in payment, if the work is worth \$10?

185. Eight dollars are $\frac{1}{5}$ less than Walter paid for a watch, and \$4 more than he paid for a chain. Find the cost of the watch and chain.

186. A boy is 7 years old, and his father is 5 times as old. How many times the son's age equals the difference between their ages? In how many years will the son's age equal $\frac{1}{2}$ the difference between their ages?

187. A kite in the air fell $\frac{2}{3}$ of the distance it was from the ground, then arose $\frac{1}{3}$ the distance it had fallen, and then fell $\frac{1}{4}$ of the distance it then was from the ground, and now is 24 feet in the air. How high was it at first?

188. Grant was 32 years old when he was married, and $\frac{5}{8}$ of his age were 8 years less than $\frac{7}{8}$ of his wife's age. How old was his wife?

189. If $\frac{2}{3}$ of an army were taken prisoners, $\frac{3}{7}$ of the remainder killed, $\frac{1}{2}$ as many wounded as were killed and taken prisoners, and 9,000 men escaped unhurt, how many men were in the army?

190. Having a farm, I sold $\frac{2}{3}$ of it, bought $\frac{5}{6}$ as much as I had sold, deeded away $\frac{7}{8}$ of what I then had, and still had 95 acres. How many acres had I at first?

191. My watch and chain cost \$235, and $\frac{8}{9}$ of the cost

of the chain, plus $\frac{1}{4}$ of the cost of the watch, equal the cost of the watch. What did each cost?

192. A fishing rod is 18 feet long, and $\frac{7}{9}$ of the length of the rod diminished by 5 feet equal $\frac{3}{5}$ of the length of the line. How long is the line?

193. When 34 feet more than $\frac{2}{11}$ of a tree were broken off, $\frac{5}{8}$ of the tree remained. How high was the tree?

194. Three fourths of Maud's cherries increased by 7 equal $\frac{7}{8}$ of them diminished by 2. How many cherries had she?

195. A thief stole $\frac{7}{8}$ of Arthur's money and spent $\frac{5}{7}$ of it before he was caught, and when he was caught he had $45 more of it than Arthur then had. How much money had Arthur at first?

196. A pole 98 feet high is broken into two unequal pieces, so that $1\frac{3}{5}$ times the shorter equal $\frac{8}{9}$ of the longer. What was the length of each piece?

197. A gentleman divided 78 cents among three boys, giving to the second $\frac{2}{3}$ as many as to the first, and to the third $\frac{3}{4}$ as many as to the second. How many cents did each receive?

198. Adam bought a cow with $\frac{5}{8}$ of his money, 6 sheep at $3\frac{1}{2}$ each with $\frac{2}{3}$ of the remainder, and chickens at $\frac{1}{2}$ of a dollar apiece with the remainder. How many chickens were bought?

199. A horse cost $80, and $\frac{3}{4}$ of the cost of the horse equal $\frac{5}{6}$ of 3 times the cost of a wagon. What is the cost of the wagon?

200. If 4 horses eat 8 bushels of oats in 2 days, how many bushels will 3 horses eat in 12 days?

201. After spending $\frac{3}{7}$ of his fortune, and $\frac{2}{3}$ of the remainder, a gentleman had $1,600. What was his fortune?

202. How much more will 4 dozen oranges cost at $\$\frac{1}{5}$ for $\frac{1}{2}$ dozen than 3 dozen pears at the rate of 3 for 5 cents?

203. A lamp cost $\$6\frac{3}{4}$, a chair $\frac{1}{3}$ more than the lamp, and a picture $\frac{1}{2}$ as much as both the former. What did all cost?

204. Frank is 24 years old. If his age were increased by its $\frac{5}{8}$, the sum would be $3\frac{1}{4}$ times his brother's age. How old is his brother?

205. Oliver had $\$\frac{3}{5}$, his father gave him $\frac{3}{4}$ as much as he had, and his mother gave him $\frac{5}{7}$ as much as he then had. How much has he now?

206. Philip, who owned $\frac{4}{5}$ of a ship, sold $\frac{2}{3}$ of his share and still has $3,600 in the ship. What is the ship worth?

207. Mr. Smith gave $\frac{2}{5}$ of his property to his wife, $\frac{1}{2}$ of the remainder he divided equally between his 2 daughters, and the other half he divided equally among his 3 sons. What part of the property did each child receive?

208. The lower section of a flag pole is $\frac{1}{3}$ of the entire length, and the middle section is $\frac{2}{3}$ as long as the lower section. How long is the pole, if the top section is 36 feet?

209. If $\frac{3}{5}$ of a bushel of nuts are worth $1.20, what are $\frac{5}{8}$ of a bushel worth?

210. Hattie spent 48 cents, which were $\frac{3}{5}$ of what she had left, and $\frac{3}{5}$ of what Robert had. How many cents did each have?

211. A paid $99 for beeves, and $\frac{4}{5}$ of the dollars paid equal 11 times the number of beeves purchased. What were the beeves worth apiece?

212. Harley gave his brother 24 plums, which were $\frac{4}{5}$

of what he had at first more than his brother, and $\frac{1}{2}$ of what his brother now has. How many had each at first?

213. Hammond lost 36 cents, then found $\frac{3}{4}$ as many as he had lost, and then had $\frac{5}{6}$ as many as he had at first. How many cents had he at first?

214. Anna has 15 beads and Susan has 10, and 12 times what both have equal $7\frac{1}{2}$ times what Maud has. How many has Maud?

215. Hiram can do certain work in 3 days, and Emery in 7 days. In how many days can Emery do as much as Hiram in 7 days?

216. A poultry dealer has 225 turkeys, ducks, and chickens. There are $\frac{2}{3}$ as many turkeys as chickens, and $\frac{5}{6}$ as many ducks as chickens. How many of each are there?

217. A, B and C have 231 marbles. B has $\frac{3}{4}$ as many as A, and C has $\frac{7}{8}$ as many as B. How many marbles has each?

218. Two thirds of Mamie's cards equal Carrie's, and $\frac{3}{4}$ of Carrie's equal Emma's. How many cards has each, if together they have 52?

219. Reuben earned $\frac{5}{6}$ as much as Oliver, and Hiram earned $\frac{2}{5}$ as much as both. How much did each earn, if together they earned $154.

220. A jeweler sold a watch and chain for $180, and $\frac{4}{5}$ of this are 8 times what the chain cost. What is the gain or loss, if the watch cost 10 times as much as the chain?

221. The sum of two numbers is 165, and their difference is equal to $\frac{1}{5}$ of the lesser. What are the numbers?

222. A, B and C bought 900 bushels of wheat. If A paid $\frac{1}{3}$, B $\frac{2}{5}$, and C the remainder, how many bushels should each receive?

223. If Ella can do a piece of work in $5\frac{2}{3}$ days, what fraction of it can she do in $\frac{1}{2}$ of a day?

224. If $\frac{6}{7}$ of a number are multiplied by 5, $\frac{3}{5}$ of the product are 72. What is the number?

225. If a ring and its case cost \$36, and $\frac{2}{3}$ of the cost of the ring minus \$14 equal the cost of the case, find the cost of each?

226. Mr. Jones paid \$22 more than $\frac{3}{7}$ of his money for a heater, and had $\frac{2}{5}$ of his money left. What did the stove cost?

227. A cyclist rode a certain distance, and then returned 8 miles more than $\frac{3}{5}$ of the distance. If he has now ridden 68 miles, how far from the starting point is he?

228. If the sum of two numbers is 98, and their difference is equal to $\frac{1}{4}$ of the greater, what are the numbers?

229. Harry and Lawrence together own $\frac{2}{3}$ of a factory, valued at \$21,000. If Harry owns $\frac{3}{4}$ as much as Lawrence, what is each one's share?

230. If I sold $\frac{2}{5}$ of my hay for what $\frac{5}{7}$ of it cost, what is the value of the remainder, if I gained \$22 on the hay sold?

231. John is $\frac{3}{4}$ older than James, and James is $\frac{3}{4}$ older than Harry. How many times Harry's age is John's?

232. I bought a desk for $\frac{5}{8}$ of its list price, and a chair for $\frac{2}{15}$ of the cost of the desk. If both cost \$51, what was the cost of each?

233. If a man breathes about 18 times a minute and inhales about $\frac{5}{8}$ of a quart of air at each breath, and a boy breathes about 30 times a minute and inhales about $\frac{1}{4}$ of a quart of air at each breath, how long will it require the boy to inhale as much air as the man inhales in 1 hour?

# COMPOUND QUANTITIES

## LIQUID MEASURE

TABLE

| | | |
|---|---|---|
| 4 gills (gi.) | equal | 1 pint (pt.). |
| 2 pints | " | 1 quart (qt.). |
| 4 quarts | " | 1 gallon (gal.). |

1. How many gills are there in 3 pints? In 4 quarts? In 6 gallons?

2. How many gills are there in 3 quarts 1 pint?

3. How many pints are there in 2 quarts? In 5 gallons? In 3 gallons 1 quart?

4. How many quarts are there in 8 gallons? In 5 gallons 3 quarts? In 24 gills? In 12 pints?

5. What fraction of 2 pints are 3 gills?

6. What fraction of 3 gallons are 5 pints?

7. What must I pay for 3 gallons of milk at 6 cents a quart?

8. A lamp burns 2 gills of oil each night. How many gallons will it burn in 32 nights?

9. A merchant bought a hogshead (63 gal.) of molasses for $25, and sold it at the rate of 6 cents a pint. How much did he gain by the transaction?

10. If 1 pint of cream is worth 10 cents, what are 3 gallons of cream worth?

11. How many times $3\frac{1}{2}$ pints are 5 gallons 3 quarts 2 pints?

12. From a vessel containing 30 gallons, 4 gallons 3 quarts were drawn. How much was left in the vessel?

## DRY MEASURE

TABLE

2 pints (pt.) equal 1 quart (qt.).
8 quarts " 1 peck (pk.).
4 pecks " 1 bushel (bu.).

13. How many pints are there in a peck? In a bushel?

14. How many quarts are there in 4 bushels? In 72 pints? In 10 pecks?

15. How many pecks are there in 72 quarts? In 112 pints? In $4\frac{3}{4}$ bushels?

16. In 128 quarts how many pecks are there? How many bushels?

17. I paid 2 cents for 1 quart of salt. At this rate what would a bushel cost?

18. If a flock of turkeys eat 3 quarts 1 pint of corn in 1 day, how long will 1 bushel 1 peck last?

19. What fraction of a bushel are 2 pecks 3 quarts? 3 pecks 6 quarts?

20. Which cost the more and how much, 4 bushels 3 quarts of berries at 5 cents a quart, or 12 bushels 1 peck of pears at 60 cents a bushel?

21. At $1 a bushel, how many dollars will 2 bushels 4 quarts of walnuts cost?

22. What will $4\frac{1}{2}$ pecks of tomatoes cost at 60 cents a bushel?

23. A dealer pays $1.50 for a bushel of chestnuts, and sells them at 5 cents a pint. What does he gain on a bushel?

24. At the rate of 5 cents a pint, what must be paid for 2 pecks of peanuts?

## AVOIRDUPOIS WEIGHT

TABLE

| | | |
|---|---|---|
| 16 ounces (oz.) | equal | 1 pound (lb.). |
| 2,000 pounds | " | 1 ton (T.). |
| 2,240 pounds | " | 1 long ton. |

25. How many ounces are there in 6 pounds?

26. How many pounds are there in 80 ounces? In 144 ounces?

27. How many ounces are there in $2\frac{3}{4}$ pounds? In $4\frac{1}{2}$ pounds?

28. How many ounces are there in 6 pounds 12 ounces? In 2 pounds 3 ounces?

29. How many pounds are there in 6 tons? In $2\frac{1}{2}$ tons? In $3\frac{4}{5}$ tons?

30. What fraction of one hundred weight (100 lbs.) are 72 pounds? Are 96 pounds?

31. What will 12 pounds 8 ounces of butter cost at 25 cents a pound?

32. Mr. Smith divided 1 pound 8 ounces of candy equally among his 8 children. How much did each receive?

33. What will 3,920 pounds of coal cost, at $5 a long ton?

34. How much money must I pay for 3 ducks, each weighing 3 pounds 8 ounces, at 20 cents a pound?

35. If Mr. Brown sells 2 tons 80 pounds of hay at $15 a ton, and takes wheat in exchange at 95 cents a bushel, how many bushels of wheat will he receive?

36. If the projectile weighs 500 pounds, and the charge of powder weighs 250 pounds, what fraction of a ton is the entire charge of the gun?

## TROY WEIGHT

TABLE

24 grains (grs.) equal 1 pennyweight (pwt.).
20 pennyweights " 1 ounce (oz.).
12 ounces " 1 pound (lb.).

37. How many grains are there in 1 ounce? In 1 pound?

38. How many ounces are there in 4 pounds? In 400 pennyweights? In 960 grains?

39. What fraction of 1 pound are 2 ounces 8 pennyweights? Are 25 pennyweights?

40. If silver is worth 2 cents a pennyweight, what is 1 pound worth?

41. If silver is worth 40 cents an ounce, and gold is worth 30 times as much, what is a pound of gold worth?

42. If an avoirdupois pound weighs 7,000 grains, and a troy pound weighs 5,760 grains, how many grains heavier is the one than the other?

43. Which is the heavier, an ounce of silver (troy) or an ounce of lead (avoirdupois)?

44. A gold watch case weighing 2 ounces was sold at 2 cents a grain. How much was received for it?

45. How many teaspoons weighing $1\frac{1}{2}$ ounces each can be made from 8 pounds of silver?

46. What fraction of 4 pounds are 3 pounds 2 ounces?

47. Find the weight of 1 dozen silver spoons each weighing 1 ounce 10 pennyweights?

48. What is the difference in weight between two dozen silver tablespoons weighing 2 pounds, and two dozen silver teaspoons weighing 300 pennyweights?

## LONG MEASURE

TABLE

| | | | |
|---|---|---|---|
| 12 | inches (in.). | equal | 1 foot (ft.). |
| 3 | feet | " | 1 yard (yd.). |
| $5\frac{1}{2}$ | yards or $16\frac{1}{2}$ feet | " | 1 rod (rd.). |
| 320 | rods | " | 1 mile (mi.). |

**49.** How many inches are there in 3 feet? In 4 yards? In 1 rod?

**50.** How many yards are there in 1 mile? How many feet?

**51.** How many yards in 96 inches? In 100 feet? In 12 rods?

**52.** What fraction of 1 rod 1 yard are 2 feet 6 inches? Are 3 feet 4 inches?

**53.** How much money must be paid for a fence 10 yards 2 feet 6 inches long, at 50 cents a foot?

**54.** At the rate of $3\frac{1}{2}$ cents an inch, what will a yard-stick cost?

**55.** How many yards of wire will be required to fence a lot measuring 42 feet one way and 68 feet the other, if the fence is 5 wires high?

**56.** How much border will it take to go around a room 12 feet long and 10 feet wide?

**57.** If a man steps $2\frac{1}{2}$ feet at each step, how many steps will he take in walking 1 mile?

**58.** How much greater is $\frac{1}{2}$ of a rod than $\frac{1}{2}$ of a foot?

**59.** What must I pay for a rope 100 feet long at 5 cents a yard?

**60.** When a yard of carpet 1 yard wide costs 84 cents, how many cents should a yard of carpet of the same quality 30 inches wide cost?

## SURFACE OR SQUARE MEASURE

TABLE

| | | | |
|---|---|---|---|
| 144 | square inches (sq. in.) | equal | 1 square foot (sq. ft.). |
| 9 | square feet | " | 1 square yard (sq. yd.). |
| 30¼ | square yards | " | 1 square rod (sq. rd.). |
| 160 | square rods, or | " | 1 acre (A.). |
| 10 | square chains (sq. ch.) | | |
| 640 | acres | " | 1 square mile (sq. mi.). |

**61.** How many square inches are there in 5 square feet? In 5 square yards?

**62.** In 8 square rods how many square yards are there? How many square feet?

**63.** Since there are 50 square chains in 5 acres, how many square chains are there in 8 acres?

**64.** How many square rods are there in 5 acres? In 1 square chain?

**65.** Since the area of a rectangular surface, which has length and width only, is equal to the length multiplied by the width, what is the area of a room 15 feet long and 12 feet wide?

**66.** What is the area of one side of a book measuring 6 inches one way and 4 inches the other?

**67.** How many square rods are there in a field 24 rods long and 20 rods wide?

**68.** What will it cost to paint the floor of a room 12 feet long and 10 feet wide, at 25 cents a square yard?

**69.** How many square feet are there in 4 boards each 18 feet long and 1½ feet wide?

**70.** What is the difference between 2 square feet and a surface 2 feet square?

71. How many lots, each containing 64 square rods, can be made from 6 acres?

72. How many acres are there in a field 12 chains long and 10 chains wide?

## CUBIC OR SOLID MEASURE

TABLE

| | | | |
|---|---|---|---|
| 1,728 | cubic inches (cu. in.) | equal | 1 cubic foot (cu. ft.). |
| 27 | cubic feet | " | 1 cubic yard (cu. yd.). |
| 16 | cubic feet | " | 1 cord foot (cd. ft.). |
| 8 cord feet or 128 | cubic feet | " | 1 cord (cd.). |

73. How many cubic inches are there in 5 cubic feet?

74. How many cubic feet are there in 4 cubic yards? In 3 cords?

75. Since the volume of a rectangular solid is equal to the product of its length, breadth, and thickness, what is the volume of a brick 6 inches long, 4 inches wide, and 3 inches thick?

76. What is the volume of a pile of wood 8 feet long, 4 feet wide, and 4 feet high?

77. How many cubic feet of earth will be removed in digging a cellar 30 feet long, 20 feet wide, and 8 feet deep?

78. How many cubic feet of water can be placed in a vessel 21 feet long, 5 feet wide and 3 feet deep?

79. If 1 cubic foot contains 27 bricks, how many bricks are there in a pile 10 feet long, 3 feet wide, and 3 feet high?

80. If a cubic foot of water weighs $62\frac{1}{2}$ pounds, how many pounds of water can be placed in a vessel 8 feet long, 2 feet wide, and 9 inches deep?

81. The capacity of a box is 150 cubic feet. If one of the dimensions is 6 feet and another 5 feet, what is the third?

82. If it cost $24 to build a wall 16 feet long and $1\frac{1}{2}$ feet thick, at 25 cents a cubic foot, how high was the wall?

83. What is the difference in volume between a 4-inch cube and 4 cubic inches?

## TIME MEASURE

TABLE

| | | | |
|---|---|---|---|
| 60 | seconds (sec.) | equal 1 | minute (min.). |
| 60 | minutes | " 1 | hour (hr.). |
| 24 | hours | " 1 | day (da.). |
| 7 | days | " 1 | week (wk.). |
| 365 | days | " 1 | common year (yr.). |
| 366 | days | " 1 | leap year. |
| 100 | years | " 1 | century. |

84. How many minutes are there in 120 seconds? In 4 hours? In 1 day?

85. How many weeks are there in 1 common year?

86. Name each month that has 30 days. Name each month that has 31 days?

87. How many days are there in March and April?

88. How many days are there from June 1 to July 15?

89. How long is it from 20 minutes before 8 in the morning to 12 minutes before 2 in the afternoon.

90. If I give a note May 1 for 60 days, when is it due?

91. A boy skated 15 miles in 1 hour 15 minutes. What was his rate per hour?

92. If a common year begins on Monday, on what day of the week does it end?

93. If there are 30 days in 1 month, how many days are there in 5 months and 20 days?

94. What fraction of 1 hour are 45 minutes?

95. If I can do a piece of work in 18 minutes, how many hours will it take me to do 9 times as much work?

96. Frank goes to school at 15 minutes before 9, and returns at 18 minutes after 12. How long is he absent?

97. Reduce 1 year 6 months to years.

98. Reduce 2 years 8 months to years.

99. Reduce 4 years 9 months to years.

100. Reduce 4 years 6 months 15 days to years.

101. Reduce 4 years 5 months 10 days to years.

NOTE.—For United States Money, see page 42.

## ENGLISH MONEY

TABLE

| | | |
|---|---|---|
| 4 farthings (far.) | equal | 1 penny (d.). |
| 12 pence | " | 1 shilling (s.). |
| 20 shillings | " | 1 pound (£). |

102. How many pence are there in 8 farthings? In 5 shillings? In 1 pound?

103. If 1 pound is worth $4.8665, what are 4 pounds worth?

104. What is 1 shilling worth in United States money? 12 shillings?

105. What fraction of 4 pence are 7 farthings?

106. What fraction of $\frac{5}{8}$ of 12 shillings are 5 pence?

107. If 21 shillings equal 1 guinea, what is a guinea worth in United States money?

## COUNTING

TABLE

| | | | |
|---|---|---|---|
| 12 | units | equal | 1 dozen. |
| 12 | dozen | " | 1 gross. |
| 12 | gross | " | 1 great gross. |
| 20 | units | " | 1 score. |

TABLE

| | | | |
|---|---|---|---|
| 24 | sheets | equal | 1 quire. |
| 20 | quires | " | 1 ream. |
| 2 | reams | " | 1 bundle. |
| 5 | bundles | " | 1 bale. |

**108.** How many units are there in 1 gross? In 5 score? In 8 dozen?

**109.** How much is paid for 1 ream of paper at the rate of $\frac{1}{4}$ of a cent a sheet?

**110.** A dealer bought 150 oranges at 20 cents a dozen. How much money did they cost?

**111.** A gross of pens was bought for 50 cents, and sold at the rate of 6 pens for 5 cents. What was the gain?

**112.** How old is a man whose age is 4 score and 10 years?

**113.** How much are 12 quires of paper worth at $3 a ream?

**114.** What will 16 lead pencils cost at $1.80 a gross?

**115.** At 45 cents a dozen, what will $3\frac{3}{4}$ score of pens cost?

**116.** By buying a number of pens at 42 cents a gross, and selling them 2 for 1 cent, I gained $1.20. What was the number of pens?

117. What is the cost of 14 buttons at the rate of 18 cents a dozen?

118. A merchant buys paper at $1.50 a ream, and sells it at the rate of 3 sheets for 2 cents. What is his profit on $1\frac{2}{3}$ reams?

119. How many sheets of paper are there in 1 bundle of paper? In 1 bale?

## REVIEW PROBLEMS

1. How many inches are there in 1 yard 1 foot 1 inch?

2. Find the cost of $3\frac{2}{3}$ yards of linen at 10 cents a foot?

3. What will it cost to dig 6 yards 2 feet of ditch, at 25 cents a foot?

4. Find the cost of a piece of oilcloth 7 feet square, at 12 cents a square foot?

5. What will a matting 6 by 16 feet cost, at 25 cents a square yard?

6. If granite is worth $2 a cubic foot, how many dollars will 2 blocks, each 4 feet long, 3 feet wide, and 2 feet thick cost?

7. If pencils are bought at $2 a gross, and sold at 30 cents a dozen, what is the gain on 576 pencils?

8. What will a roll of butter weighing 5 pounds 8 ounces cost at 32 cents a pound?

9. When salt is worth 10 cents a pound, what will $2\frac{7}{8}$ tons cost?

10. How much money will 1 gallon 3 quarts 1 pint of syrup cost at 12 cents a pint?

11. A had 1 pound 9 ounces 15 pennyweights 18 grains of gold dust, and sold $\frac{2}{3}$ of it. How much had he left?

12. How many cubic yards of water are there in a cistern 3 yards deep, 6 feet wide, and 12 feet long? How long will it take to empty it, if a cubic foot is pumped out every 20 minutes?

13. What is the value of 3 ounces 4 pennyweights of gold, at 5 cents a grain?

14. If peanuts are bought at $2.50 a bushel, and sold at 5 cents a pint, what is gained in the sale of $3\frac{1}{2}$ bushels?

15. How many hours, minutes and seconds in $\frac{3}{7}$ of a day? In $\frac{1}{3}$ of a day?

16. How many square inches are on the faces of a 6-inch cube?

17. What will 9 score of pigeons cost at $3 a dozen?

18. If Mr. Artman buys paper at $1.20 a ream, and sells it at the rate of 2 sheets for a cent, what will his profit be on $2\frac{2}{3}$ reams?

19. If Anthony has 3 pecks 2 quarts 1 pint of chestnuts, and Rufus has 4 pecks 3 quarts 1 pint, how many pecks have both?

20. A druggist had 7 gallons 3 quarts 1 pint of spirits, and sold $\frac{1}{2}$ of it at 8 cents a gill. How much money did he receive for what he sold?

21. If there are 231 cubic inches in a gallon, how many cubic inches are there in 1 quart and 1 pint?

22. How many shillings and pence are there in $\frac{5}{6}$ of a pound?

23. If I bought $3\frac{3}{4}$ pounds of silver at 40 cents an ounce, what did it cost?

24. How many bottles holding 2 gills each can be filled from a jug containing $4\frac{1}{2}$ gallons of liquid?

25. How many times as many cubic feet are there in a 6-foot cube as in a cube of $\frac{1}{3}$ the dimensions?

**26.** Reduce 126 gallons to barrels. ($31\frac{1}{2}$ gallons equal 1 barrel.)

**27.** Reduce 1,729 gills to higher denominations.

**28.** Change 2 bushels 3 pecks 4 quarts 1 pint to pecks.

**29.** Change 1 week 1 day 13 hours to hours.

**30.** How many more days are there in the months that have 31 days each than in all the other months?

**31.** How much larger is a square 9 feet on a side, than one 2 feet square?

**32.** What is coal worth per pound at $5 per ton?

**33.** Change 1,200 sheets to reams.

**34.** What is the value of 9 square yards of carpet at 7 cents a square foot?

**35.** Find the cost of a plot of ground, the dimensions of which are $2\frac{2}{3}$ feet by $7\frac{1}{2}$ feet, at $45 a square yard?

**36.** If 1,000 shingles cover 100 square feet, how many shingles will be required to cover a roof 30 feet by 50 feet.

**37.** What is the price of 5 pounds 4 ounces of tea at 64 cents a pound?

**38.** What is the value of 7 pounds 8 ounces of butter at 20 cents a pound?

**39.** If coal is worth 50 cents a hundredweight, what are $\frac{7}{8}$ of a ton worth?

**40.** In order to lay a gas pipe a ditch 100 yards long, 2 feet deep, and $\frac{1}{3}$ of a yard wide was dug. How much earth was removed?

**41.** How much profit is there in buying 4 bushels 3 pecks of chestnuts at $4 per bushel, and selling them at 10 cents a pint?

**42.** How many half-pint boxes may be filled from $1\frac{7}{8}$ bushels of beans?

43. What is the cost of 15 hooks at 36 cents a score?

44. How deep must a cistern $4\frac{1}{2}$ by 6 feet be to contain 27 cubic yards?

45. If I bought a box containing 15 pencils for 25 cents, what did I gain per box by selling them at 5 cents apiece?

46. If a grocer buys syrup at 30 cents a gallon, how must he sell it to gain 3 cents a quart?

47. At 24 cents a peck, how many bushels of pears can be bought for $9.60?

48. Which is the more costly, and how much: 4 bushels 3 pecks 1 quart of beans at 10 cents a quart, or 12 bushels 2 pecks of potatoes at 60 cents a bushel?

49. What fraction of $\frac{3}{4}$ of a pound are $\frac{5}{6}$ of a shilling?

50. How many shillings are there in 23 pence? How many farthings?

51. What is the value of 4 pounds of gold, if 4 pennyweights are worth $4?

52. Which is heavier, an ounce of gold, or an ounce of lead? A pound of gold, or a pound of lead?

53. How many square feet are in a room that contains 36 square yards?

54. What is the difference between a surface containing 3 square feet and one a yard square?

55. What fraction of 2 gallons are 2 gills?

56. If a ream of paper costs $\frac{2}{3}$ of $18, what is the cost per quire, and what do I gain by selling the quire at 6 cents a sheet?

57. Find the cost of 5 gross of pens at the rate of 3 pens for 2 cents?

58. How many vials each holding a gill can be filled from a demijohn holding 1 gallon 3 quarts 1 pint 1 gill?

59. By selling a quantity of berries at 5 cents a pint, Jane received $4. How many pecks did she sell?

60. If my father's age is 4 score and 10 years, and my mother's age is $\frac{8}{9}$ as much, what is the sum of their ages?

61. A hardware dealer buys $5\frac{1}{2}$ dozen axes at $15 a dozen. How shall he sell them apiece to gain $\frac{2}{5}$ of the cost?

62. A room is 10 feet long, 12 feet wide and 9 feet high. Find the volume of air in it. The number of square feet in the floor and ceiling. In the sides. In the ends.

63. At $6 a rod, what will it cost to dig a trench $\frac{3}{8}$ of a mile long?

64. If a strip of carpet is 3 feet wide, how many strips will be required for a room 18 feet wide?

65. If each strip of carpet for a room 21 feet long and 15 feet wide is 21 feet long and 1 yard wide, how many yards of carpet will it take to cover the room?

66. A room to be carpeted with strips of carpet 2 feet wide is 16 feet by 18 feet. How many strips will there be, and how many yards of carpet, if the strips are laid lengthwise?

67. Find the cost of carpeting a room 16 by 21 feet with carpet $2\frac{2}{3}$ feet wide, at $2 a yard, if the strips are laid lengthwise?

68. How many wooden blocks 2 inches long, 2 inches wide, and 2 inches thick, will it take to fill the same space as a block 12 inches long, 10 inches wide, and 8 inches thick?

69. I bought $\frac{5}{8}$ of a bushel of chestnuts at $1\frac{3}{5}$ a bushel, and sold them at 5 cents a half quart. Find the gain?

70. At 20 cents a quart, how many gallons of molasses can be bought for $10?

71. If I bought 5 bushels of wheat at $1\frac{1}{2}$ cents a pound, and sold it at 5 cents a quart, what did I gain, provided a bushel of wheat weighs 60 pounds?

72. How many spoons, each weighing $1\frac{1}{2}$ ounces, can be made from $4\frac{1}{2}$ pounds of silver?

73. At $\$\frac{3}{4}$ a bushel, what must be paid for 480 pounds of wheat?

74. How much time is there from 15 minutes past 10 A.M. to 20 minutes before 4 P.M.?

75. How many 3-pint bottles can be filled from a barrel ($31\frac{1}{2}$ gallons) of cider?

76. If 1 bushel of clover seed weighs 64 pounds, what are 3 pecks worth at $4\frac{1}{2}$ cents a pound?

77. Reduce $\frac{1}{16}$ of a gallon to the fraction of a pint?

78. What fraction of a quart is $\frac{1}{64}$ of a bushel?

79. What fraction of an ounce, avoirdupois, is $\frac{1}{2}$ of a grain?

80. Reduce $5\frac{1}{2}$ hundredweight 8 ounces to the fraction of a ton.

81. If a field is 40 rods wide and 80 rods long, how long should a fence be to enclose it?

82. From a barrel of syrup 16 gallons 2 quarts were drawn. How much syrup was left in the barrel?

83. If a bushel of oats weighs 32 pounds, what fraction of 3 bushels are 16 pounds?

84. The circumference of a wheel is about $3\frac{1}{7}$ times the diameter. If the rear wheel of a bicycle, the diameter of which is 28 inches, revolves 3 times every time the pedal revolves once, how far is the machine advanced for every revolution of the pedal?

85. If a train travels $\frac{3}{5}$ of a mile in 72 seconds, what is the rate per hour?

86. If a room 27 feet long requires 63 yards of carpet 3 feet wide to cover it, what is the width of the room?

87. What is the cost, at 20 cents a square foot, of a piece of matting $10\frac{1}{2}$ yards long and 48 inches wide?

88. What must be the length of a board 15 inches wide to contain 5 square yards?

89. If each person in a room is allowed 100 cubic feet of air, how high should be the ceiling of a room 30 by 40 feet in order to accommodate 120 persons?

90. Find the cost of removing the ground from a ditch 120 feet long, 6 feet wide and 3 feet deep, at $\$\frac{3}{4}$ a cubic yard.

91. Find the cost of 6 boards 12 feet long and $1\frac{1}{3}$ feet wide, at 8 cents a square foot.

92. Find the number of 4-inch cubes that can be cut from a block of marble $1\frac{2}{3}$ feet wide, 12 inches thick, and 1 yard long.

93. If my watch lost 1 second every half hour, how much time did it lose during April, 1898?

94. How many boards, each 16 feet long and 9 inches wide, will be required to cover 288 square feet of space?

95. How many gallons are there in a cistern 10 feet long, 8 feet wide and 4 feet deep, allowing $7\frac{1}{2}$ gallons to a cubic foot?

96. What must be the length of a pile of wood 8 feet high and 4 feet wide to contain 5 cords?

97. If a train runs 110 miles in 2 hours 30 minutes, what is the rate per hour?

98. If a man received $6 for ice cream at 10 cents a pint, how many gallons did he sell?

# PERCENTAGE

Per cent means by the hundred. 5 % (5 per cent) of anything are $\frac{5}{100}$ of it?

1. How many hundredths of an apple are 10 % of it?

SOLUTION.—10% of an apple are $\frac{10}{100}$ of it.

2. How many hundredths of a circle are 20 % of it? 25 %? 40 %? 60 %? 75 %? 112 %?

3. How many pounds are 4 % of a ton? 12 %? 30 %? 50 %? 70 %? 90 %?

4. What fraction of a number are 45 % of it?

SOLUTION.—45 % of a number are $\frac{45}{100}$, or $\frac{9}{20}$ of it.

5. What fraction of a number are 15 % of it? 28 %? 30 %? 64 %? 85 %? 96 %?

6. What fraction of a number are 8 % of it? $12\frac{1}{2}$ %? $18\frac{1}{3}$ %? $62\frac{1}{2}$ %? $66\frac{2}{3}$ %? $87\frac{1}{2}$ %?

7. What fraction of a number are 6 % of it? $13\frac{1}{3}$ %? $14\frac{2}{7}$ %? $18\frac{3}{4}$ %? $37\frac{1}{2}$ %? $87\frac{1}{2}$ %?

8. What fraction of anything is $\frac{1}{2}$ % of it? $\frac{1}{3}$ %? $\frac{1}{4}$ %? $\frac{1}{5}$ %? $\frac{5}{6}$ %? $\frac{7}{9}$ %?

9. What per cent of an orange is $\frac{1}{2}$ of it?

SOLUTION.—An orange is $\frac{100}{100}$, or 100% of itself, and $\frac{1}{2}$ of an orange is $\frac{1}{2}$ of 100%, or 50%.

10. What per cent of a pear is $\frac{1}{3}$ of it? $\frac{1}{5}$? $\frac{1}{4}$? $\frac{1}{6}$? $\frac{1}{7}$? $\frac{1}{9}$?

11. What per cent of a number are $\frac{3}{8}$ of it? $\frac{2}{3}$? $\frac{2}{4}$? $\frac{5}{6}$? $\frac{4}{5}$? $\frac{7}{8}$?

12. What per cent of a number are $\frac{4}{5}$ of it? $\frac{6}{9}$? $\frac{8}{9}$? $\frac{3}{10}$? $\frac{4}{25}$? $\frac{3}{20}$?

13. What per cent of anything is $\frac{1}{12}$ of it? $\frac{1}{15}$? $\frac{1}{50}$? $\frac{7}{20}$? $\frac{1}{16}$? $\frac{4}{30}$?

14. What are 15% of 40 marbles?

SOLUTION.—Since 15% of anything are $\frac{15}{100}$, or $\frac{3}{20}$ of it, 15% of 40 marbles are $\frac{3}{20}$ of 40 marbles, or 6 marbles.

15. What are 5% of $50? 20% of 40 turkeys?

16. What are 25% of 72 sheep? 15% of 90 apples?

17. What are 8% of 150? 6% of 200?

18. What are $12\frac{1}{2}$% of 64? $16\frac{2}{3}$% of 48?

19. What are $33\frac{1}{3}$% of 96? $66\frac{2}{3}$% of 120?

20. If I gain 30% on $240, how much money is gained?

21. John bought a cow for $35, and sold her at a gain of 20%. What was the gain?

22. Harry bought a wagon for $50, and sold it at a loss of 40%. What was the loss?

23. Mr. Black sold 25% of his 90-acre farm. How many acres had he left?

24. Hudson had $250, but spent 60% of it at college. How much had he left?

25. A farmer who had 180 bushels of wheat sold $33\frac{1}{3}$% of it. How much did he keep?

26. Mr. Jones earned $350, and gave 20% of it to A, and $12\frac{1}{2}$% of it to B. How much did he still have?

27. Having $190, I paid 20% of it for board, 25% for clothing, and 30% for other expenses. How many dollars did I spend for each?

28. Ira buys a bill of goods for $45, but gets a discount of 10% for cash. How much does he pay?

29. What are $1\frac{2}{3}$% of 400? $\frac{1}{4}$% of 200? $\frac{2}{5}$% of 750 turkeys? $\frac{5}{8}$% of 600 bushels?

30. If $37\frac{1}{2}$% of $200 are $\frac{3}{7}$ of my money, what is my money?

31. I bought 8 cows for $35 each, and sold them at a gain of 14⅞ %. How much was gained in all?

32. Which is the better, and how much, to sell $300 worth of goods at 40 % profit, or $2,000 worth at 8 % profit?

33. Which is the greater, and how much, 25 % of 40 marbles, or 15 % of 60 marbles?

34. If a laborer who receives $1.40 a day has his wages reduced 15 %, how much does he then receive?

35. A gained 35 % on his capital? What fraction of his capital equals the gain?

36. At a gain of 8⅓ %, what fraction of the cost equals the gain?

37. William spent 25 % of $60 for a suit, and 20 % of the remainder for a hat. How much money had he left?

38. Harry having a lot which cost $175, sold it at a gain of 20 %. If the purchaser sold it at a loss of 20 %, what did the latter receive for it?

39. If oranges are bought at 25 cents a dozen, at what price must they be sold to gain 12 %.

40. Thirty-seven and one-half per cent of $200 are $\frac{3}{5}$ of what Frank paid for a house. If he afterwards sold it at a loss of 8 %, how much did he receive for it?

41. Andrew owned 25 sheep, and Calvin owned 3 times as many. Andrew sold Calvin 20 % of his sheep, and then bought 40 % of Calvin's. How many had each after these transactions?

42. By selling a wagon for $10 more than it cost, a man gained 30 %. What did the wagon cost?

SOLUTION (1).—Since 30%, or $\frac{3}{10}$ of the cost of a wagon, are $10, $\frac{1}{10}$ of its cost is $\frac{1}{3}$ of $10, or $\$\frac{10}{3}$, and $\frac{10}{10}$, or the cost of the wagon, are 10 times $\frac{10}{3}$, which are $\frac{100}{3}$, or $33\frac{1}{3}$.

SOLUTION (2).—Since 30% of the cost of a wagon are \$10, 1% of its cost is $\frac{1}{30}$ of \$10, or $\$\frac{1}{3}$, and 100%, or the cost of the wagon, are 100 times $\$\frac{1}{3}$, which are $\$\frac{100}{3}$, or $\$33\frac{1}{3}$.

43. A farmer gained 25% by selling a cow for \$8 more than she cost. What did the cow cost?

44. Charles, by selling a sleigh for \$20 less than it cost, lost 50%. What did the sleigh cost?

45. Mr. Kane rented his house for \$144, which are 8% of what it cost. What did the house cost?

46. If by selling cloth at 25% gain I make 16 cents, what did the cloth cost?

47. When cloth was sold at 15 cents less than cost 10% was lost. What was the cost of the cloth?

48. Twenty dollars are 5% of my money. How much money have I?

49. Thirty-two are $8\frac{1}{3}\%$ of what number? 20 are $16\frac{2}{3}\%$ of what number?

50. Sixty-six are $66\frac{2}{3}\%$ of what number? 84 are $87\frac{1}{2}\%$ of what number?

51. Fifteen are $\frac{1}{2}\%$ of what number? $\frac{1}{6}\%$ of what number?

52. I sold a dog for \$5, and thereby gained 25%. What was the cost of the dog?

53. A horse was sold for \$150. If 20% were gained by this transaction, what was the cost of the horse?

54. A miller sold some damaged flour for \$8, and thereby lost $37\frac{1}{2}\%$. What was the cost of the flour?

55. Mr. Kurtz sold a lot for \$165, and thereby lost $33\frac{1}{3}\%$. How much money did the lot cost him?

56. A merchant gained 25% by selling cloth at \$1.50 per yard. How should he have sold it to gain $12\frac{1}{2}\%$?

57. If by selling land at \$108 an acre I gain 35%, what would be the selling price to lose 60%?

58. Albert sold his bicycle for $45, thereby losing 10%. How should he have sold it so as to gain 10%?

59. A house was sold for $2,500. If 20% were lost thereby, for how many dollars should it have been sold to gain 20%?

60. John sold a horse to George at a gain of 25%, and George sold the horse to James for $210, which was a gain of $16\frac{2}{3}$%. How much money did John pay for the horse?

61. Twenty sheep were sold for $88\frac{8}{9}$% of their cost, by which there was a loss of $18. How much money did they cost?

62. By raising the price of sugar $1\frac{1}{4}$ cents a pound, a merchant gained 50% instead of 25%. What did the sugar cost per pound?

63. If my expenses were increased 25%, I would save $75 less each year. What is my salary, if I save $33\frac{1}{3}$% of what my expenses are?

64. A man sold two wagons for $75 each. On one he gained 25% and on the other he lost 25%. Did he gain or lose by the transaction, and how much?

65. A drover sold two horses for $125 each. On one he lost 20% and on the other he gained 20%. How much money did he gain or lose by the transaction?

66. A man paid $81 for a buggy, which was 10% less than its value, and he sold it for 10% more than its value. What did he gain by the transaction?

67. By selling a lot for $33\frac{1}{3}$% less than my asking price, I made a profit of 25%. If the asking price was $600, what was the cost?

68. Some machinery was bought for $18\frac{3}{4}$% less than its value, and sold for $18\frac{3}{4}$% more than its value. If

the difference between the cost and the selling price was $90, what was its value?

69. What per cent of $5 are $4?

SOLUTION.—$4 are $\frac{4}{5}$ of $5, and $\frac{4}{5}$ equal $\frac{80}{100}$, or 80%. Therefore $4 are 80% of $5.

70. What per cent of 8 are 2? Of 6 are 3? Of 20 are 4? Of 15 are 5?

71. What per cent of 18 are 12? Of 30 are 5? Of 60 are 5? Of 50 are 35?

72. What per cent of 3 are 6? Of 4 are 12? Of 10 are 14? Of 105 are 20?

73. What per cent of $\frac{1}{3}$ is $\frac{1}{2}$? Of $\frac{3}{4}$ are $\frac{4}{5}$? Of $\frac{3}{5}$ is $\frac{1}{4}$? Of $\frac{5}{6}$ are $\frac{2}{3}$?

74. What per cent of $4\frac{1}{2}$ are $2\frac{1}{2}$? Of $3\frac{2}{3}$ are $1\frac{2}{3}$? Of 5 are $1\frac{3}{4}$? Of $5\frac{3}{5}$ are $2\frac{1}{2}$?

75. A dealer bought a watch for $10, and sold it for $15. What was the gain per cent?

76. A farmer bought a carriage for $60, and sold it for $50. What was the loss per cent?

77. If from 25 gallons I take 15 gallons, what per cent do I take?

78. Harry bought apples at the rate of 3 for 2 cents, and sold them at the rate of 2 for 3 cents. What was the gain per cent?

79. A drover bought 10 sheep for $50, and sold them at $6 each. Find the gain per cent.

80. Arthur sold a horse for $120, thereby gaining $30. What was the cost. What was the gain per cent?

81. An organ was sold for $140, which were $1\frac{2}{5}$ times its cost. What was the gain per cent?

82. A dealer sells 3 bicycles for what 4 cost him. Find his gain per cent.

83. Three fourths of 40 are what per cent of $\frac{9}{10}$ of 120?

84. By selling eggs for 18 cents a dozen I gain 50%. What per cent would I gain by selling them at 30 cents a score?

85. A bought 125 bushels of wheat. He sold 20% of it at cost, and on the remainder he gained 25%. What per cent did he gain on the whole?

86. Minnie sold some peaches for $10, and thereby cleared $\frac{1}{4}$ of her money. What would she have lost per cent if she had sold them for $5?

87. Mr. Williams having $2,000, gave his son 40% of it and the rest to his wife. What per cent of the son's share did the wife receive?

88. If 3 quarts of water are added to 5 gallons of wine, what per cent of the mixture is water?

89. A teacher's salary is $1,000 a year. He spends $400 for board, $150 for traveling, and $125 for books. What per cent of his salary does he spend for each, and what does he save?

90. A man sold a piano for $350, and thereby gained $16\frac{2}{3}$%. What per cent would he have lost if he had sold it for $240?

91. What is paid for a book listed at $1.50, and sold at 20% and 10% off?

SOLUTION.—A discount of 20% is $\frac{20}{100}$, or $\frac{1}{5}$, of $1.50, or $.30, and the proceeds are $1.50 minus $.30, or $1.20. A discount of 10% is $\frac{10}{100}$, or $\frac{1}{10}$, of $1.20, or $.12, and the net proceeds are $1.20 minus $.12, or $1.08.

92. An organ is listed at $175, and sold at $\frac{1}{5}$ and 5% off. Find the price paid.

93. Find the amount due on a bill of $200, subject to a discount of 10 and 5%.

94. A bill of goods at list price amounted to $320. The discounts were $\frac{1}{4}$ and 15%. What was due on the bill?

**95.** What is the net amount of a bill of $300, discounts being $33\frac{1}{3}\%$, $10\%$, and $5\%$?

**96.** A merchant marks goods at $40\%$ above cost, and sells them at a discount of $20\%$ from the marked price. What is the gain per cent?

**97.** On a bill of $100, find the difference between a single discount of $40\%$ and two successive discounts of $20\%$ and $20\%$.

**98.** What must a dealer ask for a bicycle which cost $75, that he may give a discount of $10\%$ and still gain $20\%$?

**99.** An agent sells $200 worth of goods, and receives $5\%$ commission for selling them. What does the agent get for his services?

**100.** An agent charges $8\%$ for collecting $4,000. How much does he receive for his services?

**101.** What is a real estate agent's commission, at $4\%$, for renting a store for one year at $25 per month?

**102.** A receives $5\%$ for purchasing cotton. How much does he invest in cotton if his commission is $25?

**103.** A lawyer sold a house on a commission of $2\frac{1}{2}\%$. If the lawyer's commission was $50, what did his employer receive?

**104.** If an agent charges $15 for collecting a bill of $250, what per cent does he charge?

**105.** If a tax collector receives $75 for collecting $2,500, what is his rate of commission?

**106.** Mr. Scott received $945. After deducting his commission of $5\%$, how many bushels of wheat at $1\frac{1}{4}$ a bushel can he buy?

**107.** If $832 were required to purchase a bill of goods and pay my agent his commission of $4\%$, how many dollars were invested in goods?

108. An auctioneer sold goods to the amount of $2,500, at a commission of $3\frac{1}{2}\%$. What was his commission?

109. How many shares of stock at $50 per share can a banker pay for with $6,300, if he deducts a commission or brokerage of $5\%$?

110. How much money must be paid to insure a house for $1,500, at $1\frac{1}{4}\%$?

111. A house was insured for $3,500, at $1\%$. What was the premium or cost of insuring?

112. Furniture valued at $1,600 was insured at the rate of $\frac{1}{8}\%$. Find the premium.

113. How much will it cost to insure a ship for $50,000, at $1\frac{1}{2}\%$ premium?

114. Find the cost of an insurance policy for $2,500, at $1\frac{3}{4}\%$ premium.

115. A house was insured for $\frac{2}{3}$ of $15,000, at $1\frac{3}{4}\%$ premium. How much did the insurance cost?

116. A merchant's goods are valued at $6,400. If he insures them at $1\frac{1}{2}\%$ on $\frac{5}{8}$ of their value, what is the premium?

117. If it costs $15 to insure my stock at $1\%$, what is the value of the stock?

118. If a man paid $75 insurance on his property at $1\frac{1}{2}\%$, what was its value?

119. The premium at $\frac{5}{8}\%$ for insuring some goods was $30. What was the amount of the policy?

120. If it costs $60 to insure a ship for $\frac{2}{3}$ of its value, at a premium of $1\frac{1}{2}\%$, what is its value?

121. If I pay $35 to insure my house for $3,500, what is the rate?

122. A house worth $9,000 is insured for $\frac{2}{3}$ its value, at a cost of $84. What is the rate of premium?

# INTEREST

1. What is the interest of \$120 for 1 year at 6%?

SOLUTION.—At 6%, $\frac{6}{100}$ of the principal equal the interest. $\frac{6}{100}$ of \$120 are \$7.20. Therefore the interest of \$120 for 1 year is \$7.20.

Find the interest for 1 year:

2. Of \$50 at 6%.
3. Of \$70 at 5%.
4. Of \$100 at 10%.
5. Of \$200 at 4%.
6. Of \$300 at 8%.
7. Of \$400 at 7%.
8. Of \$150 at $4\frac{1}{2}$%.
9. Of \$600 at $5\frac{1}{2}$%.
10. Of \$225 at $7\frac{1}{2}$%.
11. Of \$25.50 at 5%.
12. Of \$80.75 at 4%.
13. Of \$500 at 11%.
14. Of \$750 at 9%.
15. Of \$25 at $6\frac{1}{4}$%.
16. What is the interest of \$200 for 4 years at 6%?

SOLUTION (1).—For 4 years at 6%, $\frac{24}{100}$ of the principal equal the interest. $\frac{24}{100}$ of \$200 are \$48. Therefore the interest of \$200 for 4 years at 6% is \$48.

SOLUTION (2).—For 1 year at 6%, $\frac{6}{100}$ of the principal equal the interest. $\frac{6}{100}$ of \$200 are \$12, and the interest for 4 years is 4 times \$12, or \$48. Therefore, etc.

17. What is the interest of \$80 for 2 years at 6%?
18. What is the interest of \$100 for 5 years at 4%?
19. What is the interest of \$250 for 8 years at 5%?
20. What is the interest of \$450 for 6 years at 7%?
21. What is the interest of \$700 for 3 years at 8%?
22. What is the interest of \$500 for 10 years at 10%?
23. What is the interest of \$175 for $2\frac{1}{2}$ years at 5%?
24. What is the interest of \$180 for $3\frac{1}{4}$ years at 4%?
25. What is the interest of \$120 for $2\frac{2}{3}$ years at 6%? For $4\frac{1}{3}$ years at 6%?

26. What is the interest of \$375 for $1\frac{5}{6}$ years at 8%? For $3\frac{1}{4}$ years at 8%?

27. What is the interest of \$1,000 for $1\frac{1}{12}$ years at 12%?

28. What is the interest of \$800 for $3\frac{3}{4}$ years at 7%?

29. What is the interest of \$240 for 1 year 9 months at 8%?

30. What is the interest of \$125 for 2 years 6 months at 6%?

31. What is the interest of \$200 for 3 years 4 months at $4\frac{1}{2}$%?

32. What is the interest of \$400 for 5 years 3 months at 4%?

33. What is the interest of \$600 for 6 years 10 months at 6%?

34. What is the interest of \$360 for 8 years 4 months at 7%?

35. What is the interest of \$50 for 1 year 8 months at 5%?

36. What is the interest of \$240 for 9 years 6 months at 10%?

37. What is the interest of \$80 for 8 years 2 months at 6%?

38. What is the interest of \$280 for 5 years 9 months at 4%?

39. What is the interest of \$300 for 1 year 5 months 10 days at 9%?

SOLUTION.—5 months 10 days equal $\frac{170}{360}$, or $\frac{17}{36}$, of a year, which, added to 1 year, equal $1\frac{17}{36}$ years. For $1\frac{17}{36}$ years at 9%, $\frac{17}{100}$ of the principal equal the interest, $\frac{153}{100}$ of \$300 equal \$39. Therefore, etc.

40. What is the interest of \$200 for 3 years 2 months 12 days at 5%?

41. What is the interest of $900 for 4 years 4 months 24 days at 7½%?

42. What is the interest of $1,200 for 6 years 9 months 18 days at 10%?

43. What is the interest of $700 for 4 years 7 months 15 days at 8%?

44. What is the interest of $1,200 for 5 years 5 months 20 days at 9%?

45. What is the interest of $1,500 for 7 years 6 months 6 days at 6%?

46. What is the amount of $100 for 2 years 6 months at 8%?

SOLUTION.—For 2 years 6 months at 8%, $\frac{20}{100}$, or $\frac{1}{5}$ the principal equals the interest, and $\frac{5}{5}$ plus $\frac{1}{5}$ or $\frac{6}{5}$ of the principal equal the amount. $\frac{6}{5}$ of $100 are $120. Therefore, etc.

47. What is the amount of $200 for 5 years at 6%?

48. What is the amount of $400 for 8 years at 5%?

49. What is the amount of $700 for 10 years at 7%?

50. What is the amount of $650 for 8 years at 10%?

51. What is the amount of $450 for 4 years at 9%?

52. What is the amount of $325 for 3 years at 8%?

53. What is the amount of $500 for 7 years 6 months at 6%?

54. What is the amount of $600 for 5 years 4 months at 5%?

55. What is the amount of $250 for 3 years 9 months at 4%?

56. What is the amount of $700 for 8 years 2 months 12 days at 5%?

57. What is the amount of $280 for 10 years 7 months 15 days at 8%?

58. How much money will each receive, if I divide the amount of $4,000 for 4 years 6 months 12 days at 9%, among 6 men?

59. Mr. Smith mortgaged his property for $2,000. What was his indebtedness at the end of 3 years 9 months 18 days, at 5%?

60. I borrowed $4,000 at 5% and built a house. The insurance and taxes amounted to 1% of the value each year. After 5 years and 6 months I sold the house for $7,000. What did I make, provided I rented the house for $16$\frac{2}{3}$ per month?

61. John's money, which is $500, is $\frac{5}{4}$ of Andrew's money. How much more interest will John receive than Andrew, in 8 years at 7$\frac{1}{2}$%?

62. Since any sum of money at 6% will gain $\frac{1}{100}$ of itself in 60 days, or $\frac{1}{6}$ of a year, what is the interest of $40 for 60 days at 6%?

63. How many places to the left must the decimal point be moved to find the interest of any sum of money for 60 days at 6%?

By moving the decimal point, find the interest for 60 days at 6%:

64. Of $240.
65. Of $780.
66. Of $896.
67. Of $1,000.
68. Of $1,250.
69. Of $1,450.
70. Of $1,670.
71. Of $3,680.
72. Of $4,580.
73. What is the interest of $850 for 90 days at 6%?
74. What is the interest of $750 for 60 days at 9%?
75. What is the interest of $500 for 60 days at 12%?
76. What is the interest of $200 for 63 days at 6%?
77. What is the interest of $650 for 120 days at 6%?
78. What is the interest of $400 for 45 days at 6%?
79. What is the interest of $640 for 72 days at 6%?
80. What is the interest of $250 for 95 days at 6%?
81. What is the interest of $120 for 60 days at 5%?
82. What is the interest of $960 for 60 days at 7%?
83. What is the interest of $3,500 for 60 days at 8%?

**84.** What is the interest of \$840 for 63 days at 5%?

**85.** What principal will yield \$90 in 5 years at 6%?

SOLUTION.—In 5 years at 6%, $\frac{30}{100}$, or $\frac{3}{10}$ of the principal equal the interest. Since $\frac{3}{10}$ of the principal equal \$90, $\frac{1}{10}$ of the principal equals $\frac{1}{3}$ of \$90, or \$30, and $\frac{10}{10}$, or the principal, equal 10 times \$30, or \$300. Therefore, etc.

**86.** What principal will yield \$50 in 4 years, at 5%?

**87.** What principal will yield \$20 in 5 years, at 8%?

**88.** What principal will yield \$320 in 8 years, at 4%?

**89.** What principal will yield \$490 in 7 years, at 7%?

**90.** What principal will yield \$300 in 6 years 8 months, at 6%?

**91.** What principal will yield \$517 in 7 years 6 months, at 5%?

**92.** What principal will yield \$630 in 8 years 4 months, at 7%?

**93.** What principal will yield \$1,250 in 6 years 3 months, at 8%?

**94.** How much does a man owe if he pays \$275 interest in 5 years 6 months 20 days, at 9%?

**95.** What principal will amount to \$682 in 7 years 6 months, at 5%?

**96.** What principal will amount to \$218 in 1 year 6 months, at 6%?

**97.** What principal will amount to \$2,600 in 7 years 6 months, at 4%?

**98.** The amount of $\frac{4}{5}$ of the cost of a house for 2 years at 5% is \$1,100. What is the cost of the house?

**99.** What sum will amount to \$1,020 in 120 days, at 6%?

**100.** How much money must be put on interest to amount to \$980 in 8 years 4 months, at 9%?

**101.** How much money must be placed on interest, at 6%, to yield \$396 each year?

**102.** If Robert loaned 3 times as much money as David, and the sum of the interest received by both for 4 years 8 months, at 6%, is $560, how much money did each loan?

**103.** Stephen and Oliver placed sums of money on interest for 4 years 3 months, at 8%. If Stephen's interest exceeds Oliver's by $136 and Oliver's interest is $170, what principal has each?

**104.** B's money was equal to $\frac{4}{5}$ of A's money. If $\frac{2}{3}$ of their money were placed on interest for 5 years 7 months 10 days, at 6%, the interest would be $606. How much money had each?

**105.** If I paid $556 to satisfy a debt that had been drawing interest 6 years 6 months, at 6%, what was the debt?

**106.** Mr. Campbell invested $\frac{5}{8}$ of his money in coal land, and at the end of 3 years 9 months sold it for $29,000, at an average yearly profit of 12%. How much money had he at first?

**107.** In what time will $500 at 6% yield $75 interest?

SOLUTION.—Since in 1 year, at 6%, $500 will yield $30 interest, to yield $75, as many years will be required as 30 are contained times in 75, or $2\frac{1}{2}$ years.

**108.** In what time will $200 at 6% yield $60 interest?

**109.** In what time will $350 at 4% yield $35 interest?

**110.** In what time will $600 at 5% yield $100 interest?

**111.** In what time will $300 at 7% yield $98 interest?

**112.** In what time will $450 at 8% yield $135 interest?

**113.** In what time will $1,000 at 9% yield $210 interest?

**114.** In what time will $800 at 6% amount to $896?

**115.** In what time will $700 at 5% amount to $805?

**116.** In what time will $250 at 4% amount to $275?

117. In what time will \$1,200 at 7% amount to \$1,326?

118. In what time will \$100 at 6% amount to \$200?

119. In what time will a principal double itself at 4%? 5%? 8%? 10%?

120. In what time will a principal treble itself, at 5%? 10%? 25%? 12½%?

121. If a note for \$2,400 at 6% was not paid until the interest equalled ⅛ of the face, how long did it run?

122. If I had an amount of money on interest at 8% until the interest equalled twice the principal, how long was it out?

123. If a certain principal at 4% amounts to \$560, and at 6% amounts to \$640, what is the principal and what the time?

124. I hold two notes of the same date, and for the same principal. The first is at 6%, and the second at 9%. What is the face and what the time of the notes, if the first amounts to \$726, and the second to \$789?

125. At what rate per cent will \$50 in 4 years yield \$10 interest?

SOLUTION.—Since the interest on \$50 at 1% in 4 years is \$2, for \$50 to yield \$10, as many per cent will be required as 2 are contained times in 10, or 5%.

126. At what rate per cent will \$150 in 5 years yield \$60 interest?

127. At what rate will \$300 in 5 years yield \$90 interest?

128. At what rate will \$200 in 4 years yield \$64 interest?

129. At what rate will \$400 in 10 years yield \$280 interest?

130. At what rate will \$600 in 5 years yield \$270 interest?

131. At what rate will \$500 in 10 years amount to \$800?

132. At what rate will \$1,000 in 7 years 6 months amount to \$1,450?

133. At what rate will \$1,200 in 5 years 4 months amount to \$1,584?

134. At what rate will a principal double itself in 5 years? In 10 years? In $12\frac{1}{2}$ years?

135. At what rate will a principal treble itself in $33\frac{1}{3}$ years? In 50 years?

136. What is the rate when the interest of \$450 for 2 years 4 months is \$52.50?

137. Mr. Brown paid \$5,000 for a house, which he rented for \$550 a year. If repairs and insurance cost him \$275 yearly, what rate of interest did the investment yield?

138. What is the rate of interest, when \$2,000 yield an income of \$6 a month?

139. When \$805 is the amount of a sum of money for 3 years at a certain rate of interest, and \$1,050 is the amount of the same principal, for 10 years, at the same rate, what are the principal and rate?

140. If the amount of a certain principal at a certain rate for 5 years 6 months is \$864, and for 6 years 8 months is \$920, find the rate and the principal?

## REVIEW PROBLEMS

1. Fifteen books are what per cent of 45 books?

2. Edward having 120 sheep, sold 20% of them. How many sheep did he keep?

3. A boy having 25 marbles lost 3 and gave away 7. What per cent had he left?

4. In an orchard of 500 trees, 10% are apple trees, 10% of the others are peach trees, and the remainder are pear trees. What per cent of all are pear trees? How many pear trees are there?

5. If there are 20 school days in a month, and a boy misses 2 days, what is the percentage of his attendance?

6. A man having some money spent $19 for a suit and $6 for shoes and a hat. If he spent 25% of his money, how much money had he at first?

7. Amy spent 5 cents for a doll, 3 cents for candy, and had 10 cents left. What per cent of her money did she spend?

8. A speculator spent 40% of his money for wheat, 15% for corn, 20% for woodland, and had $2,500 left. How much money had he at first?

9. Philip bought a picture for $2, and sold it for $2.50. What per cent did he gain?

10. A farmer bought an old buggy for $40. After spending $10 for repairs, he sold it for $75. What was his gain per cent?

11. What is the loss per cent if a man buys a farm for $15,000, and sells it for $12,000?

12. An agent who receives 40% discount, sells paper at 20% off the marked price. What per cent of the selling price is his commission?

13. If two men buy a house for $1,800, paying $1,000 and $800 respectively, what per cent and how many dollars of the yearly rent should each receive, if the house rents for $20 a month?

14. If a laborer works 4 days each week, what per cent of the week does he work?

15. Grant raised 500 bushels of potatoes, and Henry raised 600 bushels. What per cent of Henry's number of bushels is Grant's? What per cent of Henry's is the difference? What per cent of Grant's is the difference?

16. If a grain dealer buys 25 bushels of clover seed for $200, and sells it at $10 a bushel, what is the gain per cent?

17. A man borrowed $1,000 at 10% and went into business. At the end of the year his stock was worth $1,500, and he had $500 in bank. What per cent did he realize on the capital?

18. Frederick reduced his profit from 24% to 21%, thereby losing $90. What was the cost? The marked price? The selling price?

19. A man bought 100 bushels of wheat at 90 cents a bushel, and found that 25% of it was unsalable, but sold the rest at a profit of 10% on the entire cost. What was the selling price per bushel?

20. A drover sold 2 cows at $40 apiece. On the one he gained 20%, and on the other he lost 20%. How much did he gain or lose by the transaction?

21. If I gain 25% by selling a machine for $500, for how much should I sell it to gain 40%?

22. What is the selling price of cloth marked at $2 per yard, and sold at 20%, 10%, and 5% discount?

23. What is the discount on an article sold at 25% and 15% off?

24. By selling lace at $2.20 a yard, 10% were gained. What would be the selling price per yard at a loss of 5%?

25. If 80% of the selling price equal 120% of the cost, what is the gain per cent?

**26.** A invested 40 % of his money in real estate and 50 % of the remainder in bank stock. How much money had he at first, if the real estate cost $2,000 more than the bank stock?

**27.** If the loss is 25 % and the selling price is $750, what is the cost?

**28.** If the gain was 10 % of the selling price, and the cost was $100, what was the selling price?

**29.** At what price must goods that cost $4 be marked, that I may fall 20 % and still gain 20 %?

**30.** A merchant marked his goods at 40 % above cost, and then dropped 40 % from the marked price. Did he gain or lose, and how much?

**31.** James bought a cow for $30, and sold her so as to gain 40 % of the selling price. How much money did he receive for her?

**32.** A milliner sold ribbon that cost $1.75 at $2 a yard. What was the gain per cent?

**33.** What is the difference between buying goods at 30 % discount, or at 10 %, 10 %, and 10 % off?

**34.** If a farm, bought at 80 % of its real value, was sold for $6,000, at a gain of 20%, what was the real value?

**35.** If the profits equal 40 % of the selling price, what is the gain per cent?

**36.** If the loss equals 40 % of the selling price, what is the loss per cent?

**37.** If a merchant sells tea at a loss of 4 cents a pound, and the loss is 8 % of the selling price, what is the cost of the tea? What is the loss per cent?

**38.** I buy goods listed at $600, at 33⅓ % discount, and an additional 5 % discount for cash. What is the selling price, and the gain per cent, if I sell them at an advance of 10 % on the list price?

**39.** What will be the amount on $500 for 3 years 9 months, at 6%?

**40.** Find the principal and the rate, if the amount for 3 years is $363, and for 8 years is $468.

**41.** If 40% of Matthew's crop of corn equal 50% of Andrew's crop, and Matthew has 350 bushels more than Andrew, how many bushels has each?

**42.** Frederick sold a watch to Thomas at a loss of 25%. What per cent of the loss was the selling price?

**43.** If 50% of the selling price equal 75% of the cost, what is the gain per cent?

**44.** I paid $280 for a piano at discounts of 30% and 20%. What was the asking price?

**45.** A merchant has a suit that cost him $25. How shall he mark it that he may fall 20% from the marked price and still gain 20%?

**46.** If a drover received as much money for 3 sheep as he paid for 5, what was his gain per cent?

**47.** If paper costs $2 a ream, how many reams must be sold, at a profit of 25%, to clear $16?

**48.** A man owed one creditor $560, and another $780. If he failed and his property paid only 60%, what would each creditor receive?

**49.** Frank bought wheat at 99 cents a bushel, and sold it so that 10% of the selling price equalled the loss. Find the loss per cent.

**50.** A man, by selling a house for $330 gains 10%. What per cent does he gain or lose, if he sells the house for 10% less than $330?

**51.** What is the rate of an agent's commission, if he receives $24 for selling $480 worth of goods?

**52.** At 5% commission an agent receives $480. What is the amount of sales?

53. If a collector received $300 for collecting taxes at 4% commission, what was the amount collected?

54. If I send an agent $416 to buy cloth at $4 a yard, and he charges 4% commission, how many yards can he buy?

55. Mr. Smith bought 120 shares of $25-stock at 20% discount. Find the cost.

56. If I bought stock at 75% and sold it at 110%, what per cent did I gain?

57. If $50-stock sells at $20, what is the loss per cent?

58. My property is valued at $3,000. What is my tax, at the rate of $1\frac{1}{5}\%$ for school purposes, $\frac{2}{5}\%$ for water, $\frac{2}{5}\%$ for light, and 1% for other purposes?

59. If $96 were lost by selling goods at a loss of 12%, what would have been the selling price at a gain of 25%?

60. After losing $30 more than 30% of his money, a clerk had $180. How much money had he at first?

61. A and B engage in business. A furnishes 30% and B 70% of the capital. At the end of the year the profits are $2,500. What is each man's share?

62. Two men engage in business, the first furnishing 20% more capital than the second. What is each man's share of the profits, if they realize 22% on an investment of $3,000?

63. If a ton of hay is purchased at 75% of the market price, and sold at 125% of the market price, what is the gain per cent?

64. What is the rate of taxation, when a house assessed at $4,000 costs $160 for taxes?

65. If an agent sells a house for $6,000, and charges $3\frac{1}{3}\%$ commission, what does the owner of the house receive?

66. An architect receives $48 on a 3% commission. What is the valuation of the building?

67. A grocer has three grades of coffee, worth respectively 25, 30 and 32 cents per pound. If he mixes them, and sells the mixture at a gain of 25%, what is the selling price per pound?

68. Harry lost 20% of his marbles, and then purchased $\frac{1}{5}$ as many as he had left. If he now has 288, how many had he at first?

69. I bought a load of potatoes at 90% of the market price and sold it at a gain of 40%. At what per cent above the market price was it sold?

70. If I sell goods that cost $75 for $125, what is the gain per cent?

71. If the loss was $16\frac{2}{3}$%, and the selling price was $250, what was the cost?

72. If I want to buy 200 turkeys at $2.50 each, how much money must I send my agent, that he may have a commission of 5%?

73. I had a book listed at $1, on which I was allowed a commission of 40%. If I marked it $1.25, and dropped 25% from the marked price, how much did I make?

74. A farmer asked 40% more for his horse than he paid for him, but dropped 20% from the asking price, and still made $24. What was the asking price?

75. What per cent above cost must goods be marked in order to fall 20% from the marked price and still make 20%?

76. A dealer sent his agent $6,265, with which to buy goods after deducting $25 to pay insurance and 4% commission. What was the value of the goods?

77. If my premium of insurance at $2\frac{1}{2}$% is $50, what is the amount of the insurance?

78. Henry receives \$75 for a 5% investment, and \$90 for a $4\frac{1}{2}$% investment. What is the amount of each investment?

79. What is the amount of \$200, for 2 years 6 months 20 days, at 9%?

80. John began business with \$2,000 capital. The first year he gained 20%, the second year he gained $16\frac{2}{3}$% of what he had at the end of the first year, and the third year he lost 5% of what he had at the end of the second year. How much money had he at the end of the third year?

81. A bill of goods was sold for \$50 more than they cost, at a gain of 60%. Find the cost and the selling price.

82. A farmer bought a cow, and then sold her for \$50, at a gain of $12\frac{1}{2}$%. What did the cow cost him?

83. Mr. Raup buys a lot for \$2,000, and builds a house for \$6,000. He insures the house for $\frac{2}{3}$ of its cost at $1\frac{1}{4}$%. If his house burns and he sells the lot at 20% above cost, what is his total loss?

84. What is the length of a pole which, increased by 30% and 15 feet, equals 93 feet?

85. What is the gain per cent on pencils bought at \$1.60 a gross, and sold at the rate of 2 for 5 cents?

86. Mr. Jones bought 12 horses for \$1,200, and sold 10 of them for what they all cost. What was the gain per cent on those sold?

87. Albert and Herbert together have \$600 on interest for 8 years 4 months, at 6%. They wish to divide the amount so that Herbert shall have twice as much as Albert. How much will each receive?

88. If a bankrupt paid $16\frac{2}{3}$% of his indebtedness, and Mr. Johnson received \$500, what was the amount of his claim?

89. Philip and Andrew have $1,500 on interest for 5 years 9 months, at 8%. What amount will each receive provided Andrew has twice as much as Philip?

90. Hiram bought a horse for $90, and sold it to Francis at a gain of 11⅑%, and Francis sold it to Amos at a gain of 10%. What would Amos have lost had he sold it for $90?

91. A man whose salary is $2,500 a year spends $240 for board, $300 for traveling, $250 for clothing, and $200 for benevolent purposes. What per cent of his salary does he spend for each, and what per cent does he save?

92. If a watch and chain cost $175, and the watch cost six times as much as the chain, what per cent of the cost of the watch equals the cost of the chain?

93. A dictionary cost 75% more than an atlas, and they both cost $22. Find the cost of each.

94. A man has an income of 25% of his capital and pays $300 rent, which is 4% of his income. What is his capital?

95. If I buy 25 bushels of wheat for $22.50, how must I sell it per bushel to gain 40%?

96. Three fourths of the interest paid by Fred for 4 years 6 months, at 4%, are $81. What is the amount of his indebtedness?

97. If 5 pounds of salt are dissolved in 120 pounds of water, what per cent of the brine is each?

98. If a horse was bought at 20% below his value, and sold at 10% above his value, what is the gain per cent?

99. My house cost $2,500, and my taxes and insurance amount to 4%. For how much must I rent the house to clear 8% on the investment?

**100.** How much money has a man on interest, if he receives \$210 interest for 4 years 8 months, at 9%?

**101.** Heber bought a horse for \$125, and sold him for \$100. What was the loss per cent?

**102.** By selling a carriage for \$120, a dealer gained \$24. What was the gain per cent?

**103.** In a field of 675 animals there are 25% more sheep than hogs. How many of each are there?

**104.** I insured my house and furniture for $\frac{5}{6}$ of its value at $1\frac{1}{2}\%$. If my premium was \$60, what was the value of the house and the furniture, provided the value of the furniture was $\frac{3}{17}$ that of the house?

**105.** Seven eighths are 40% more than what fraction?

**106.** If I lost $16\frac{2}{3}\%$ by selling a piano for \$500, what should I have received for it to have gained 20%?

**107.** If 40% of A's interest for 6 years 6 months, at 10% is \$520, what is his principal?

**108.** A note which has been on interest 5 years 4 months, at 9% is worth \$740. What was the face of the note?

**109.** Andrew bought some oranges at 3 cents apiece, and twice as many at 2 cents apiece. What was his gain per cent, if he sold all at 36 cents a dozen?

**110.** If Horace lost $12\frac{1}{2}\%$ by selling his horse for \$140, what would he have gained by selling him for \$200?

**111.** Lewis sold a horse for \$170, and a carriage for \$150, thereby losing 20% on each. What did both cost him?

**112.** If I sold two sleighs for \$50 apiece, and gained 25% on the one and lost 25% on the other, did I gain or lose?

113. If on January 20, 1898, I paid $226 on a note dated November 20, 1895, at 6%, what was the face of the note?

114. If an agent charges 3% for buying, how many yards of carpet, at $1.50 per yard, can be purchased with $825.03?

115. If 20% of the selling price equal 40% of the cost, what is the gain per cent?

116. What per cent would I lose by selling an article for $1.50, if I gained 15% by selling for $1.84?

117. By selling a horse for $200, I lost 20%; but I invested $150 in another horse, which I sold at a gain of 20%. How much did I gain or lose by these transactions?

118. In what time will $200, at 8%, give $96 interest?

119. After the population of a town had decreased 12½%, it numbered 58,800. What was the former population?

120. If by an increase in speed of 20% a locomotive runs 600 miles a day, how far would it run in a day if it were retarded 20%?

121. What per cent is gained by buying a farm at $75 an acre, and selling it at $87.50 an acre?

122. How much money was sent the agent with which to buy goods, if his commission at 4% is $48?

123. How much does my employer receive, if I make a $600 sale, and receive a commission of 12%?

124. If an agent collects 75% of a debt of $5,000, and charges 3⅓% for collecting, how much does he remit to his employer?

125. I offered a farmer $35 for a cow, but he would not accept this offer, as it was only 83⅓% of his price. What was his price?

126. How many tons of coal, at $4 a ton, can an agent buy with the proceeds of 750 bushels of wheat at $1.20 per bushel, if he receives 5% for buying and 6⅔% for selling?

127. If I pay $24 to insure my house for $2,000 for 3 years, what is the average annual rate of insurance?

128. After discounting a bill of goods 10% and 5%, the net price is $855. What is the list price?

129. In what time will $400, at 6%, amount to $496?

130. On goods marked 50% above cost, a discount of 8% was given. What was gained, if 5% was charged for collecting the bill?

131. If the creditors of an insolvent debtor received 75% at settlement, what per cent, and how much money, did Mr. Jones lose by previously selling his claim of $800 at 60%?

132. Mr. Johnson buys a reaper for $60 on four months' credit. If he pays cash, and money is worth 6%, what does the reaper cost him?

133. If the wholesale price is 10% less than the retail price, what is the gain at wholesale when the gain at retail is 33⅓%?

134. How should glassware be sold to clear 25% on the entire cost, if 15% were lost by breakage?

135. If I bought 65 shares of railroad stock ($100 each) at 5% discount, what is the discount and the cost of the stock?

136. In what time will a principal double itself at 6%?

137. John has 20% more money than Harry. What per cent of John's money is Harry's?

138. How much is gained on the sale of a gun listed at $50, bought at 20% discount, and sold at 20% above the list price?

**139.** Nelson's suit cost \$40. If the vest cost 20% less than the pantaloons, and the coat 20% more, what did each cost?

**140.** Mr. Russell bought a steam thresher for \$3,000. If he cleared \$530 a year by its use, what per cent did he gain on the investment, if money was worth 6%?

**141.** Samuel and James each invest \$5,000 in business. At the end of the year Samuel has gained $6\frac{4}{5}$%, and James has lost $3\frac{3}{5}$%. How much money does each then have?

**142.** If a merchant's profit each year increased his capital 20% on the preceding year, and at the end of 3 years he had \$40,000, with how much money did he begin business?

**143.** If I sent \$816 with which to buy a carriage, allowing the agent 2%, what did the carriage cost?

**144.** Which is the better for the purchaser, a discount of 20% and 10% off, or a discount of 10% and 20%?

**145.** If stock was bought at 93 and sold at 99, thereby gaining \$360, how many shares were there?

**146.** If stock worth \$600 yields \$108, what is the rate of income?

**147.** Find the interest of \$840, for 93 days, at 6%.

**148.** Find the interest of \$900, for 60 days, at 5%.

**149.** If a dealer purchased goods at a discount of 40% and 25% from the list price, and sold them at 50% of the list price, what was the gain per cent?

**150.** Nathan bought goods for \$721 on a credit of 6 months. If money is worth 6%, what sum in cash will pay the bill?

**151.** If my note is discounted at a bank for 90 days at 8% and yields \$490 proceeds, what is the face of the note?

# MISCELLANEOUS PROBLEMS

1. If a rope 72 feet long is divided in the proportion of 5 to 7, how long is each piece?

SOLUTION.—Since the rope is divided in the proportion of 5 to 7, there are 5 plus 7 or 12 equal parts. Hence 5 parts are $\frac{5}{12}$ of 72 feet, or 30 feet, and 7 parts are $\frac{7}{12}$ of 72 feet, or 42 feet.

2. Fred and Anthony hire a bicycle for $15. If Fred uses it 6 days, and Anthony 4 days, how much should each pay?

3. John and James rent a pasture for $17.28. If John pastures 15 cows for 5 days, and James pastures 23 cows for 3 days, how much should each pay?

4. In a school of 960 students, there are 9 girls to every 7 boys. How many are there of each sex?

5. A man divided some marbles among three boys in the proportion of 2, 3, and 5. If the first received 10, how many marbles did each of the others receive? How many did the man have?

6. If 2 men buy three barrels of flour and pay respectively $3 and $4, how many pounds should each receive?

7. Three men paid $9,600 for horses at $100 apiece. How many horses did each receive, if as often as the first paid $4, the second paid $5, and the third paid $7?

8. If $600 be divided into parts which are to each other as 3 to 5, they will respectively equal $\frac{3}{4}$ of A's and $\frac{5}{6}$ of B's money. How much money has each?

9. Divide $144 among three men in the proportion of $\frac{1}{2}$, 1, and $1\frac{1}{2}$.

**10.** Mr. Strong paid \$34.20 to pasture 8 cows for 3 weeks and 15 sheep for 5 weeks. How much did the pasturage of each animal cost, if the pasturage of a cow cost 4 times as much as that of a sheep?

**11.** Two men paid \$45 for a pasture; the first had 10 oxen and the other 10 times as many sheep. If a sheep eats $\frac{1}{8}$ as much as an ox, how much should each pay?

**12.** Three men bought 180 bushels of wheat for \$120. If the first paid $\frac{1}{4}$, the second $\frac{3}{8}$, and the third the remainder, how many bushels should each receive?

**13.** Two men contracted to reap a field for \$76. If the first sent 6 men for 3 days, and the second sent 10 boys for 4 days, how much should each receive, provided one man does as much as two boys?

**14.** Divide \$40 among A, B and C so that A shall have $33\frac{1}{3}$ cents as often as B has 40 cents and C has 60 cents.

**15.** If I have \$360 in an equal number of nickels, dimes, quarters and halves, how many of each kind have I?

**16.** Harry bought apples at 2 cents each, and had 16 cents left. If he had paid 3 cents each, he would have had 1 cent left. How many apples did he buy?

SOLUTION.—By the first price, each apple cost 3 minus 2, or 1 cent less than by the second, and they all cost 16 minus 1, or 15 cents less. Therefore he bought as many apples as 1 is contained times in 15, or 15 apples.

**17.** A farmer bought hogs at \$4 each, and had \$39 remaining. Had he paid \$6 each, he would have had \$5 remaining. How many hogs did he buy?

**18.** A huckster bought turkeys for \$1 each, and had \$25 left. If he had bought as many lambs at \$3 each, he would have had \$5 left. How many turkeys did he buy?

19. A drover bought a number of horses at $75 each, and had $150 left. If he had bought the same number at $90 each, he would have had $60 left. How many horses did he buy?

20. Nina gave 3 violets to each of her friends, and had 15 violets left. If she had desired to give them 7 each, she would have lacked 5. How many violets had she? Among how many friends did she divide them?

21. Mr. Wolfe, wishing to buy a number of books, found that if he bought those at 30 cents each he would have $20 left; but if he bought those at 36 cents each, he would be obliged to borrow $4 to pay for them. How many books did he wish to buy?

22. A laborer receives his board and $2 a day, and pays 75 cents for board every day he is idle. How many days was he idle, if at the end of 30 days he received $49?

SOLUTION.—Had he worked every day, he would have received 30 times $2, or $60. He therefore lost by idleness $60 minus $49, or $11. Every day he was idle he lost his board, 75 cents, and his wages, $2, or $2.75. Therefore he was idle as many days as 2.75 are contained times in 11, or 4 days.

23. John contracted to work for $2.50 a day on condition that he forfeit 50 cents each day he was idle. How many days did he work, if he received $36 at the end of 30 days?

24. Grant agreed to carry 5 dozen eggs to market at the rate of $\frac{1}{2}$ cent for each egg delivered, but was to pay $3\frac{1}{2}$ cents for each egg broken. How many eggs did he break if he received 22 cents?

25. A laborer agreed to work for $2.75 a day and board, but was to pay 50 cents a day for board for every

day he was idle. How many days did he labor, if he received $103 at the end of 80 days?

**26.** Mr. Swartz earned $3.50 a day and paid $3.50 a week for board. At the end of 20 weeks he had $301. How many days was he idle?

**27.** A boy agreed to pick 30 quarts of chestnuts at 2 cents a quart, and was to pay 5 cents for every quart he sold. If he received 18 cents, how many quarts did he sell?

**28.** In an alloy of 45 pounds there are 36 pounds of silver and 9 pounds of copper. How much copper must be added, that there may be 2 pounds of copper to 4 pounds of silver?

SOLUTION.—Since there are now 36 pounds of silver, or 9 times 4 pounds, there must be 9 times 2 pounds, or 18 pounds of copper, that there may be 2 pounds of copper to 4 pounds of silver. Therefore there must be added 18 minus 9, or 9 pounds of copper.

**29.** In a class of 96 pupils, 42 of them are boys. How many girls must leave so that there may be 5 girls to 6 boys?

**30.** In a room of 144 people there are 4 men to 2 women. How many women must be added that there may be 3 men to 5 women?

**31.** If in a field of 120 animals there are 5 sheep to 3 cows, how many sheep must be taken out that there may be 3 sheep to 5 cows?

**32.** A rope 93 feet long is divided so that $\frac{3}{4}$ of the length of the longer piece equal $\frac{4}{5}$ of the length of the shorter piece. How many feet must be taken from the longer piece that $\frac{2}{3}$ of the shorter piece may equal $\frac{3}{4}$ of the longer piece?

**33.** A mast 140 feet high was broken so that $\frac{1}{3}$ of the first piece equaled $\frac{1}{5}$ of the second piece. How many

feet must be added to the second piece so that its $\frac{1}{3}$ equals $\frac{1}{5}$ of the first piece?

34. How far can Harry go and return in 5 hours, if he goes at the rate of 3 miles an hour, and returns at the rate of 2 miles an hour?

SOLUTION.—If he goes 3 miles an hour, he goes 1 mile in $\frac{1}{3}$ of an hour, and if he returns 2 miles in 1 hour, he returns 1 mile in $\frac{1}{2}$ of an hour. Hence to go and return 1 mile requires $\frac{1}{3}$ plus $\frac{1}{2}$, or $\frac{5}{6}$ of an hour. Therefore he can go and return as many miles as $\frac{5}{6}$ are contained times in 5, or 6 miles.

35. How far can a man ride on the cars at the rate of 22 miles an hour, and return on a bicycle at the rate of 11 miles an hour, and be gone only 9 hours?

36. If I drive to town at the rate of 5 miles an hour, and return on a bicycle at the rate of 10 miles an hour, what is the distance if I spend $3\frac{3}{4}$ hours in town, and am absent $10\frac{1}{2}$ hours?

37. If a vessel goes down a river at the rate of 15 miles an hour, and returns at the rate of 10 miles an hour, and is gone only 8 hours, how far does the vessel sail?

38. An empty tank which holds 60 barrels has 2 pipes leading into it. The first pours in a barrel in 4 minutes, and the second a barrel in 6 minutes. How long will it take to fill the tank, if both pipes are open at the same time?

39. What is the time of day, if $\frac{1}{2}$ of the time past midnight equals the time to noon?

SOLUTION.—Since $\frac{1}{2}$ of the time past midnight equals the time to noon, $\frac{3}{2}$ plus $\frac{1}{2}$, or $\frac{4}{2}$ of the time past midnight equal 12 hours, the time from midnight to noon. If $\frac{4}{2}$ equal 12 hours, $\frac{3}{2}$ equal 8 hours, the time past midnight, or 8 o'clock A.M.

40. What is the time of day, when twice the time past noon equals the time to midnight?

41. What is the time of day, when $\frac{1}{6}$ of the time past midnight equals the time past noon?

42. What is the time of day, when $\frac{1}{4}$ of the time past noon equals the time to noon again?

43. What is the time of day, when $\frac{2}{3}$ of the time past noon equal $\frac{5}{6}$ of the time to midnight?

44. What is the time of day, when $\frac{1}{3}$ of the time past 4 A. M. equals $\frac{1}{2}$ of the time to 10 A. M.?

45. At what time between 4 and 5 o'clock are the hour and minute hands together?

SOLUTION.—At 4 o'clock the hour and minute hands are 20 minute spaces apart, and the minute hand must gain 20 minute spaces to overtake the hour hand. Since the minute hand passes over 60 spaces while the hour hand passes over 5, it gains 55 spaces in passing over 60 spaces. To gain 1 space it must pass over $\frac{1}{55}$ of 60, which are $\frac{60}{55}$, or $1\frac{5}{11}$ spaces, and to gain 20 spaces it must pass over 20 times $1\frac{5}{11}$ or $\frac{240}{11}$ or $21\frac{9}{11}$ spaces. Therefore they are together at $21\frac{9}{11}$ minutes past 4.

46. What is the time of day, if it is between 3 and 4 o'clock, and the hour and minute hands are opposite each other?

47. In how many minutes after 6 o'clock will the hour and minute hands be 5 minute spaces apart?

48. At what time after 4 o'clock will the hour and minute hands be at right angles to each other?

49. In how many minutes after 3 o'clock will the hour and minute hands be 5 minutes of time apart?

50. Harold being asked the time replied that $\frac{1}{3}$ of the time past 2 o'clock equalled $\frac{1}{4}$ of the time to noon. What time was it?

51. Jennie is 16 years old and Frank is 2. In how many years will Jennie be three times as old as Frank?

SOLUTION.—Since Jennie's age is always 16 minus 2, or 14 years, more than Frank's age, 14 years at the required time will equal the difference between 3 times Frank's age, or Jennie's age, and once

Frank's age, or twice Frank's age. If 14 years will equal twice Frank's age, once Frank's age will equal $\frac{1}{2}$ of 14, or 7 years. Hence Jennie will be 3 times as old as Frank in 7 minus 2, or 5 years.

52. Ruth is 8 years old and John is 28. In how many years will John be twice as old as Ruth?

53. John is 5 years old and William is 27. In how many years will William be 3 times as old as John?

54. Mr. Brown is 3 times as old as his son, who is 20 years old. How many years is it since Mr. Brown was 5 times as old as his son?

55. A is 50 years old and B is 10. How long is it since A was 9 times as old as B?

56. Albert is $\frac{1}{2}$ as old as his father, who is 48 years old. How long is it since Albert was $\frac{1}{3}$ as old as his father?

57. Five sixths of Edward's age equal $\frac{3}{4}$ of Grant's age, and the difference between their ages is 4 years. How long is it since Grant was 3 times as old as Edward?

58. A man paid \$46 for 3 sheep. If the first cost \$3 more than $\frac{2}{3}$ as much as the second, and the third cost \$3 more than $\frac{2}{3}$ as much as the first, what did each cost?

59. Amos and Aaron dig 36 rods of ditch in a week. If $\frac{2}{3}$ of what Amos digs equal $\frac{5}{6}$ of what Aaron digs, how many rods per week does each dig?

60. If 3 men or 4 boys can plaster a room in one-half of a day, how long will it take 4 men and 3 boys?

61. Norris, Budd and Warren can build a barn in 10 months, Norris and Warren can build it in 14 months. After they all had labored one-half of a year Budd left. In what time can Norris and Warren finish it?

62. Twelve boys engage a hack for a certain sum of money. But by taking 6 more boys, the cost for each was diminished 25 cents. What did the hack cost?

63. If I bought a number of pears at 3 cents each, and 4 times as many oranges at 5 cents each, then sold all at 6 cents each, and thus gained 70 cents, how many pears did I buy? How many oranges?

64. In a room 40 by 50 feet are 4 windows each 6 by $3\frac{1}{2}$ feet. What per cent of the floor surface is the window surface?

65. Mr. Kellar bought 3 houses, so that the second cost twice as much as the first, and the third cost 3 times as much as the second. If they all cost $18,000, what was the cost of each?

66. I paid $4.20 for 8 bushels of grain, consisting of corn at 60 cents a bushel, and oats at 40 cents a bushel. How many bushels of each did I buy?

67. Herbert earned $24, William earned as much as Herbert and $\frac{1}{3}$ as much as James, and James earned as much as Herbert and William together. How much did they all earn?

68. A drover lost $\frac{1}{6}$ of his sheep. Had he sold the rest at cost he would have received $80, but by keeping 4, and selling $\frac{1}{3}$ of the remainder at cost, he received $20. How many sheep had he at first?

69. If 2 boys have 76 marbles, and $\frac{2}{3}$ of the first number equal $\frac{2}{5}$ of the second, how many has each?

70. If a pole 46 feet high is broken so that $\frac{2}{3}$ of one piece plus 8 feet equal $\frac{5}{7}$ of the other piece, how many feet are there in each piece?

71. A dinner was ordered for 12 men. Since only 8 attended, their expense was increased 25 cents apiece. What was the cost of the dinner?

72. A rabbit is 40 yards ahead of a hound. If the hound runs 5 yards while the rabbit runs 4, how many yards must the hound run to catch the rabbit?

**73.** If Mr. Smith can build a wall in $5\frac{1}{4}$ days by working 8 hours a day, in how many days can he finish it by working 10 hours a day?

**74.** A lady had 2 gold cups and a cover that fits each. The cover and the first cup were worth 3 times as much as the second cup, but the second cup and the cover were worth as much as the first cup. If the second cup was worth \$40, what was the value of the first cup and of the cover?

**75.** Mr. Brown, wishing to go to a neighboring town, rides with his friend at the rate of 12 miles an hour, and walks back at the rate of 3 miles an hour. If he was on the road 9 hours, what was the distance he rode?

**76.** If $\frac{3}{4}$ of a pound of coffee cost as much as $\frac{1}{2}$ of a pound of tea, how much does each cost per pound, if 3 pounds of coffee and 4 pounds of tea cost \$3.60?

**77.** A drover has 434 sheep in 3 fields. If $\frac{2}{3}$ of those in the first field equal $\frac{3}{4}$ of those in the second, and $\frac{2}{3}$ of those in the second equal $\frac{3}{4}$ of those in the third, how many sheep are there in each field?

**78.** Henry can mow a field in 3 days, but with the assistance of William he can mow it in 2 days. How long will it take William alone to mow the field?

**79.** Mr. Noon bought a number of sheep for \$90. He lost 5 sheep, and sold the remainder for \$90, gaining on each sheep $\frac{1}{2}$ of its cost. How many sheep did he buy?

**80.** A man bought a number of pigs for \$75, he lost 10 and sold $\frac{1}{3}$ of the remainder for \$20, gaining on each pig $\frac{1}{3}$ of its cost. How many pigs did he buy?

**81.** A bought two cows, paying $\frac{2}{3}$ as much for the second as for the first. He sold the first at a loss of $\frac{1}{3}$ and the second at a gain of $\frac{1}{4}$, thereby losing \$5 on the transaction. Find the cost of each cow.

**82.** A drover after buying 100 sheep lost 25, and sold $\frac{2}{3}$ of the remainder for $\frac{3}{4}$ of the entire cost. Had he sold all the remainder at the same rate, he would have gained \$37.50. Find the cost per sheep.

**83.** John, James and Philip together earned a certain sum of money. James earned 3 times as much as John, and Philip earned $2\frac{2}{3}$ times as much as James. How much did all earn, if Philip earned \$76?

**84.** A cistern holding 144 gallons was full of water. If it has a pipe that will fill it in 12 hours, and another that will empty it in 8 hours, what part of the cistern remains filled at the end of 5 hours, if both pipes have been running all the time. How many gallons are in it?

**85.** One pipe will fill a cistern in 4 hours, a second in 5 hours, and a third will empty it in 3 hours. If the cistern is empty and the three pipes are opened, in what time will the cistern be filled?

**86.** Michael lost 15 cents, and found $\frac{1}{3}$ as much as he had left, and then had 60 cents. How many cents had he at first?

**87.** A drover had two flocks of sheep, with $\frac{5}{6}$ as many in the first as in the second. If they became mixed, and $\frac{1}{2}$ from each flock got into the other, what part of the original number was in each flock?

**88.** Amos had 56 pigeons in 1 flock and $\frac{7}{8}$ as many in another. If $\frac{3}{7}$ from each flock flew to the other, how many pigeons are now in each flock?

**89.** If a cow eats $\frac{3}{4}$ as much hay as a horse, and a ton lasts both 5 weeks, how long would a ton last each?

**90.** If two pipes fill a cask in 24 hours, and $\frac{2}{3}$ of what one pours in equal $\frac{1}{2}$ of what the other pours in, in how many hours will each fill the cask?

**91.** Two engines can pump a vat empty in 48 hours. If one pumps $\frac{3}{4}$ as fast as the other, in what time can each engine empty the vat?

**92.** Aaron has $3\frac{1}{2}$ times as many geese as Fred has, but if he gives Fred 35, their numbers will be equal. How many geese has each?

**93.** If a cyclist rides down grade at the rate of 12 miles an hour, and up grade at $\frac{3}{4}$ of that rate, how far down grade can he ride so as to return to the starting point in 42 hours?

**94.** Grant and Charles have the same income. Grant saves $\frac{1}{5}$ of his, but Charles, by spending \$250 a year more than Grant, at the end of 3 years is \$210 in debt. What is the yearly income of each?

**95.** If I divide 147 plums among 3 persons so that the third shall have $\frac{1}{2}$ as many as the first and second, and the second have $\frac{3}{4}$ as many as the first, how many plums does each receive?

**96.** Two men engage to mow a field for \$38, to be divided according to the time each works. If one works $5\frac{1}{2}$ days and mows 11 acres, and the other works twice as many days as the first mows acres per day, how much money should each receive?

**97.** Mr. Rank had two trotting horses. If he had sold the one for \$450 and the other for \$186 he would have gained 6%; but if he had sold the one for \$400, and the other at cost, he would have lost 5%. What was the cost of each horse?

**98.** If I mix 6 bushels of oats worth 27 cents a bushel with 2 bushels worth 19 cents a bushel, what is the mixture worth a bushel?

**99.** If by false weight a man paid \$45 for \$40 worth of wheat, how many pounds did he receive for a bushel?

**100.** In a school of 120 pupils there are $\frac{5}{7}$ as many boys as girls. How many boys must be added, that there may be 9 boys to 5 girls?

**101.** Andrew and Philip agreed to harvest a field of wheat for $150. If Andrew harvested 5 acres more than $\frac{1}{3}$ of the field and received $60, how many acres were there?

**102.** Benton bought a load of chickens at the rate of 5 for $1, and the same number of ducks at the rate of 4 for $1. If he sold them all at the rate of 9 for $2 and lost $1, how many of each did he buy?

**103.** If my watch gains 5 minutes every hour, what is the correct time when it shows 5 o'clock P. M., provided it was corrected at noon?

**104.** Susan spent $3 less than $\frac{1}{3}$ of her money in one store, and $2 less than $\frac{1}{3}$ of the remainder in another store, and had $16 left. How much money had she at first?

**105.** If 2 men and 3 boys earn $12, and 3 men and 4 boys earn $17, how many dollars does each man and each boy earn?

**106.** If a freight train 50 miles ahead of a passenger train runs 3 miles while the passenger runs 5 miles, how far will the passenger train run before it overtakes the freight train?

**107.** Meade contracted to work 40 days at $4.50 a day, but was to forfeit 75 cents for each day he was idle. At the end of the time he received $138. How many days was he idle?

**108.** Louis earned $30 a week, and paid $5.25 a week for board. If at the end of 20 weeks he had saved $424.50, how many weeks did he work?

**109.** I had $12.60 changed to dimes and nickels. If $\frac{5}{6}$

of the value of the dimes equalled $\frac{2}{3}$ of the value of the nickels, how many dollars of each kind of coin were there?

**110.** I have 2 trenches whose combined length is 137 feet, but $\frac{2}{3}$ of the one is 10 feet shorter than $\frac{3}{5}$ of the other. How long is each trench?

**111.** If in a building containing 600 pupils there are 200 girls, how many girls must be added, that they may compose 60% of the entire number?

**112.** Mr. Follmer bought cantaloupes at 8 cents each, and sold them at 10 cents each. If 7 of them were spoiled, and he sold the remainder for what they all cost, how many did he buy?

**113.** By adding 5 feet to each dimension of a square platform, I enlarge its surface 85 square feet. How large was the platform at first?

**114.** A contractor who paid his men \$1.50 a day, hires 6 more men and raises the wages of every man to \$2. If this increases his daily expense \$50, how many men does he employ?

**115.** Mr. Artman bought a number of books at 60 cents each, and an equal number at 75 cents each. If the better books cost \$7.35 more than the others, how many of each kind were there?

**116.** If Mr. Snyder saved \$3,600 in 9 years, when his income was $\frac{7}{5}$ of his expense, what was his yearly income?

**117.** Bruce agreed to work a year for \$360, and an overcoat. At the end of 9 months, he settled for \$265 and the overcoat. What was the price of the overcoat?

**118.** A bought stock at 10% below par value, and sold it at 10% above par value, gaining \$360. What was the par value of the stock?

**119.** If a man earned \$250 a month and left 20% in his employer's business, deposited 30% of the remainder, and lived on the balance, what per cent of his earnings did it require for support?

**120.** A's money is 20% more than B's money. What per cent of A's money is B's money?

**121.** If I paid \$5 more than $\frac{1}{2}$ of a debt the first month, \$10 more than $\frac{1}{2}$ of the remainder the second month, \$15 more than $\frac{1}{2}$ the remainder the third month, and still owe \$25, what was the amount of the debt?

**122.** If a boat goes up stream $\frac{3}{4}$ as fast as down, and requires 14 hours to go down 40 miles and return, what is the rate per hour each way?

**123.** A man sold 2 lots for \$600 each. On one he gained 20%, and on the other he lost 20%. What was his gain or loss? What was his gain or loss per cent?

**124.** What is the time of day when the minute and hour hands are together the first time after 12 o'clock?

**125.** If 2 machines can grind a quantity of grain in 5 hours, and $\frac{2}{3}$ of what one grinds equals $\frac{3}{5}$ of what the other grinds, how long will it take each to grind it all?

**126.** If the head of a whale is 5 feet long, and the tail is as long as the head plus $\frac{1}{4}$ of the length of the body, and the body is 3 times as long as the head and tail, how long is the whale?

**127.** Jacob is 10 years older than Mary. If $\frac{2}{3}$ of Jacob's age equal $\frac{4}{5}$ of Mary's, how long is it since Jacob was 3 times as old as Mary?

**128.** A merchant's price is 30% above cost, but he deducts 10% for cash. What is his gain per cent?

**129.** The introduction price of a book is 30 cents. If I buy it at 20% off and sell it at 25% on, what is the gain per cent?

**130.** What must be the asking price of an organ that cost \$80, in order to abate 20% and still make a profit of 25%?

**131.** A watch valued at \$20 is worth $\frac{1}{3}$ as much as a second watch and chain, but the chain is worth $\frac{1}{7}$ as much as the two watches are worth. What are the chain and the second watch worth?

**132.** Cyrus had a horse, a colt, and a saddle. When the horse was saddled he was worth 4 times as much as the colt, but when the colt was saddled it was worth $\frac{1}{2}$ as much as the horse. What was the value of each, if the colt was worth \$30.

**133.** Divide \$5,200 into 3 parts, which if placed on interest at 5% for 4, 10, and 12 years respectively, shall yield equal amounts of interest?

**134.** What per cent of 20% of 6 are 25% of 3?

**135.** If I have 25% more money than you, what per cent less than my money is your money?

**136.** Mark asked 25% more than cost for his horse, but sold him for 75% of the asking price. What was the gain or loss per cent?

**137.** If Clarence lost 40% of his oranges, and sold what he had left for 50% profit, what per cent did he gain or lose?

**138.** The amount of Leo's money, for 2 years, at 16%, is \$600 more than its amount for 6 years, at 5%. How much money did he have?

**139.** Two men can pick a field of cotton in 18 days. If after they had worked 10 days, they hired another and finished the work in 5 days, how many days would it have taken the third man alone to pick the cotton?

**140.** What time is it if $\frac{1}{3}$ of the time past 10 A. M. equals $\frac{2}{3}$ of the time to 7 P. M.

141. If I lost 25% of a barrel of syrup, and sold the remainder at a gain of 40% on the whole cost, what was the gain per cent on the part sold?

142. Cyrus sold 2 horses for $230. On the first horse he lost 20% and on the second he gained 25%. What per cent did he gain or lose if $\frac{4}{5}$ of the cost of the first horse equalled $\frac{2}{3}$ of the cost of the second horse?

143. After having a sum of money on interest at 6% for 10 years, I collected the interest and placed it on interest for the same time at the same rate. What was the first principal, if the second interest was $1,800.

144. If 13 men consume a barrel of pork in 78 days, how many days would it last if 7 more men were added to the number?

145. If A, by working 15 hours a day, could do a piece of work in 6 days, how many days would it take him if he worked 10 hours a day?

146. Three men buy a mill and pay respectively $3,000, $4,000, and $5,000. If they rent it for $6,000 for 3 years, what rent should each receive a year?

147. Two men do $\frac{1}{2}$ of a piece of work in 6 days, then one stops and the other finishes the work in 15 days. How long would it have taken the other man to finish the work?

148. A farmer sold some hogs for $195. Had he sold 4 times as many hogs at $1.50 each, he would have received $600. How many did he sell, and what was the price?

149. A drover sold a cow for $40 and lost 20%. With the $40 he bought another cow, which he sold at a gain of 20%. What was the gain or loss per cent?

150. Simon sold 2 horses for equal amounts. If on one he gained $33\frac{1}{3}$%, and on the other he lost $33\frac{1}{3}$%, and the total loss was $24, what was the cost of each horse?

151. I sold two pianos for $360 each, gaining 20% on the one and losing 20% on the other. What was the gain or loss per cent?

152. I have 2 kegs each containing 20 gallons of cider. If the one is worth 6 cents and the other 8 cents a gallon, and enough water be added to make 50% by selling the mixture at 7 cents a gallon, how much water is added?

153. Mr. Harris bought furniture at 25 per cent off of the list price, and 10% off for cash, and sold it for 20% advance on the list price. What was the gain per cent?

154. Jesse can cut a number of kegs of nails in 3 hours and Nathan can cut them in $4\frac{1}{2}$ hours. If Jesse, Nathan and Rufus can cut them in $1\frac{1}{2}$ hours, in what time could Rufus cut them?

155. Victor has enough hay for 25 horses or 20 cows. If he has 10 horses, how many cows must he have to eat the hay?

156. When $\frac{5}{6}$ of the selling price equal $\frac{11}{12}$ of the cost, what is the gain per cent?

157. A dinner was prepared for 36 persons, but 9 failing to attend, the cost for each of the others was increased 50 cents. What did the dinner cost?

158. How many yards of carpet $\frac{3}{4}$ of a yard wide will it take to cover a room 45 feet long and 36 feet wide, if the strips are laid lengthwise?

159. Uriah rode $\frac{1}{8}$ of a journey the first day, $\frac{2}{7}$ of the remainder and $7\frac{3}{4}$ miles the second day, when he had still to travel as far as he had come. What was the length of the journey?

160. Mr. Kritzer retailed melons at an advance of 40% on the wholesale price. He had bought them at a discount of 10%. What was the gain per cent?

161. If a boy is at the first of 15 posts, which are 20 feet apart, how far must he walk to carry the posts to a pile formed where the first post lies, provided he can carry 1 post at a time?

162. Mr. Blaine sold a horse and a carriage for equal amounts. If he gained 20% on the horse and lost 25% on the carriage, and the total loss was $50, what was the cost of each?

163. If Josiah bought oranges at the rate of 5 for 4 cents, and sold them at the rate of 4 for 5 cents, what was the gain per cent?

164. Caleb can plow a field in 10 days by working 12 hours a day. Clement can plow it in 20 days by working 8 hours a day. How long will it take both together, if they work 10 hours each day?

165. Mr. Tennis agreed to build a car track in 90 days. He employed 50 men to perform the labor, but at the end of 45 days found that $\frac{2}{3}$ of the work was still undone. How many additional men must he employ to finish the work in the required time?

166. If David sold 2 carriages for like amounts, and gained 25% on one and lost 25% on the other, what was the cost and selling price of each, when the total loss was $40?

167. A man after paying 60% of his debt found that $120 would pay 20% of the remainder. What was his whole indebtedness?

168. If Sidney's money is 25% less than Raymond's, what per cent more is Raymond's than Sidney's?

169. By mistake a clerk marked an article at only 60% of the cost, but sold it at an advance of 40% on the marked price. What was the gain or loss per cent?

**170.** A merchant marked his goods at 40% above cost. What did he gain or lose per cent if he sold them at 60% of the marked price?

**171.** If I realized 10% on stock bought at 110, what would I have realized if it had cost 90?

**172.** Leonard bought 3 horses at the same price. In selling them he gained 7% on the first, 8% on the second, but lost 5% on the third. If his total gain was $25, what did each horse cost?

**173.** Mr. Adams bought a carload of 60 animals, composed of sheep and hogs, for $340. If he paid $5 apiece for the hogs and $6 apiece for the sheep, how many of each did he buy?

**174.** Rhoda bought 20 quarts of two kinds of berries at 10 and 15 cents a quart. If she paid the same amount of money for each kind, how many quarts of each did she buy?

**175.** If I had $500 and loaned Meade $\frac{2}{7}$ as much as he already had, we would have equal amounts. How much had he at first?

**176.** If I bought pencils at 5 cents each, gave away 10, sold the remainder at 7 cents, and cleared 10 cents on the cost, how many did I buy?

**177.** If Eugene can do $\frac{3}{8}$ of a piece of work in 15 days, in what time would 5 boys of like ability do the work?

**178.** By selling a property for $6,000 I lose 25%. How should I have sold it to gain 25%?

**179.** My watch gains 3 seconds every $\frac{1}{2}$ hour. If it was correct at 12 P.M. Sunday, what is the true time when it indicates 6 P.M. Tuesday?

**180.** If a man bought a house for $3,500 and sold it for $4,200, what per cent did he gain?

181. Louisa gave 5 cents each to some children, and had 18 cents left. If she had intended to give them 10 cents each she would have lacked 52 cents. How many children were there, and how much money had she?

182. Mr. Buoy insures a property for \$2,000, or $\frac{7}{8}$ of its value, at the rate of $\frac{3}{4}$ of 1%. If the house burns what would be the loss to the company? What would be Mr. Buoy's loss?

183. Mr. Fronda sent his agent \$618 with which to buy flour at \$5 a barrel. If the agent's commission were 3%, how many barrels did he buy?

184. If I mix 4 pounds of 20-cent coffee, 3 pounds of 25-cent coffee, 2 pounds of 30-cent coffee, and 1 pound of 45-cent coffee, for how much per pound must the mixture be sold to gain 25%?

185. Find the net amount of a bill of goods of \$800, subject to discounts of 25%, 20%, and 8% off.

186. If the gain was 10% of the selling price, what was the gain per cent?

187. Rufus sold $\frac{7}{12}$ of his wheat at a gain of 10%. How must he sell the rest that there may be neither gain nor loss on the whole?

188. Simon sold a cow at a gain of 20%. If he had sold her at 20% less than he did, what would have been his gain or loss?

189. Hammond bought cotton for 20% below its real value, and was given a discount of 10% for cash. What was his gain per cent if he sold it at 16% above the real value?

190. Mr. Murray invested \$2,000 in business, and lost 30% the first year; but gained 50% on the remainder the second year. What was his gain per cent on the investment?

**191.** If I buy lemons at the rate of 3 for 5 cents, and sell them at the rate of 2 for 5 cents, what is my gain and the gain per cent on the sale of 60 lemons?

**192.** If a property which was insured for \$30,000, at $3\frac{1}{3}\%$, was burned, after it had been insured 10 years, what was the loss to the owner? What was the loss to the company?

**193.** An attorney collects a debt for a client, takes a fee of 6%, and remits \$705. What was the amount of the debt?

**194.** Mr. Swartz bought 120 shares of bank stock (\$50 each) for \$4,800. What was the rate of discount?

**195.** Daniel and Edward each spent \$4, which were $\frac{2}{3}\%$ of Daniel's and $1\frac{1}{3}\%$ of Edward's money. How much money had each?

**196.** David's income is $16\frac{2}{3}\%$ of his capital, and his taxes amount to $1\frac{1}{3}\%$ of his income. If he pays \$96 taxes, what is the amount of his income? What is the amount of his capital?

**197.** I gave a note for \$6,000 to a lawyer to collect. He compromised by taking 80%, and charged 6% for his fee. How many dollars did I receive?

**198.** I owned a watch worth \$50, sold it for \$60, and bought it back for \$70. What per cent did I gain or lose?

**199.** If an author receives $2\frac{2}{3}$ cents on the sale of a book listed at 40 cents and sold at 20% off, what per cent royalty does he receive?

**200.** An agent sold corn on a $5\frac{1}{2}\%$ commission, and invested the net proceeds in wheat at 5% commission. If the whole commission amounted to \$40, what was the value of the wheat?

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